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**An examination of the managerial decision-
making processes of experts from a
behavioural perspective.**

A thesis

**Submitted in partial fulfilment
of the requirements for the degree**

of

Doctor of Philosophy

at the

University of Waikato

by

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University of Waikato

2001

Abstract

The purpose of this study was to develop an understanding of the interaction between expertise, managerial role, and subjective behavioural characteristics. The research seeks answers to the question: What shapes the managerial decision-making processes of an expert?

Four case studies examined the decision-making processes of four domain experts who have taken on managerial roles. The studies follow a triangulated approach using interviews, observations and psychological evaluations to discover the dominant decision making processes of the experts in their managerial roles. This study includes interviews with each of the four experts, interviews with people associated with them in their work environment, the researcher's observations, and three psychological evaluations.

The research indicates that the subjective characteristics of the experts studied may determine the domain in which they became expert, and consequently the managerial role that they chose and also the managerial decision-making processes that they follow. The experts' decision-making processes seem to be shaped initially by their subjective characteristics, second by their expertise and last by their managerial role. There was however, an indication that these experts dichotomise their managerial decision-making processes to distinguish between decisions that directly involve people and other decisions. Managerial requirements create situations that require the use of the experts' subjective characteristics that are not otherwise used. It is therefore concluded that the subjective characteristics of the experts studied have shaped their managerial decision-making processes.

The outcome from a study of four experts is not expected to be valid for all experts, however it may add weight to an argument that more consideration needs to be made of the two-way interaction between expert and domain.

Acknowledgements

As with any undertaking of this magnitude there are many, many people who have provided help and guidance, or just been there to talk to when the going got tough. To all of you I am most grateful.

In particular I thank my supervisors Dr Jim Corner and Dr John Buchanan. It was John's help at the beginning of this long journey that got me started. Then Jim became my chief supervisor and allowed my free rein, but provided sufficient critical comment to guide me towards completion. I will always be grateful to you both.

I have had total support both mentally and financially from Anne, my wife, during this epic, and words alone cannot express my gratitude, but they can at least acknowledge it. Thank you Anne.

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CHAPTER 1



Introduction

1.1 Aim of the study

The intent of the research reported in this thesis was to gain a better understanding of how experts process decisions. Specifically, the research examines the influence of domain expertise, managerial role, and the experts' individual subjective characteristics on their decision-making processes. The fundamental research question that guides the study is, - What shapes the managerial decision-making processes of experts?

How that understanding would be obtained was not at all clear at first, although I did have some strong ideas on how I wanted to proceed. I had a strong conviction that I wanted to do qualitative research, and I wanted to observe and talk to experts. I began a literature review with little real sense of direction, subsequently developed a strategy which I followed while continuing to evaluate new information as it appeared. As a consequence of this exploratory approach I amassed a large amount of knowledge but was unsure how to present it, then I read Greenfield's (1996) direction for writing a thesis, which begins, "You have followed an intellectual journey across unknown territory. Think of yourself as the explorer producing a guidebook to where you have been and what you have seen and discovered in the process." (p. 88). Greenfield's advice seemed to me to be particularly apt, because in my research I explored many diverse literatures and

methodologies before settling on my chosen path, and then on several occasions I was compelled to consider additional information that I would not have been aware of had I not started this research. So, having recognised my predicament in Greenfield's writing I chose to adopt his recommendations for the development of the overall structure of my thesis.

There are, according to Greenfield (1996), five key elements to thesis writing.

You need to explain:

1. Your starting point and why you decided to embark on the journey (literature and the deficiencies revealed by evaluation which lead you to undertake the research).
2. How you decided to undertake the journey (the methodology).
3. The route you followed and the discoveries you made on the way (the substantive research chapters).
4. How in light of the above you redrew the route (analysis and interpretation).
5. Where you arrived at the end of your journey, how it differed from your starting point, and where you go from here (conclusions, knowledge added, and directions of future research in the subject) (p. 88).

As my research progressed I considered many side issues, which perhaps would not have been mentioned had I not adopted Greenfield's guidebook approach. I will discuss the consequences of these diversions in some detail later in chapter nine, for now all I will discuss is the beginning of this research.

1.2 Motivation

The research presented in this thesis was motivated by a personal interest in both experts and human behaviour that had developed during my years as a human resource management practitioner. My motivation was given greater focus during

the early stages of my research when I read Einhorn's (1974) paper on expert judgment, in which he evaluated the decision making performance of three pathologists. Einhorn analysed his data using statistical procedures, and concluded that, although the pathologists that featured in his study had provided similar test results to one another, their paths to those conclusions were not the same. To explain his observation Einhorn suggested that there are possibly many paths to the same goal, and more than one way to perform the associated cognitive tasks.

Einhorn's comment may have been no more than an addendum to his statistical evaluation, but given his outstanding reputation I am confident that he included it because he considered it to be important; for me it reinforced my resolve to pursue a qualitative research perspective. Statistical evaluation of data is a highly valued tool, but without qualitative evaluation of the data source the results may misinform. Einhorn's comments are perhaps incidental to the main focus of his paper, but they caused me to consider why experts, with extensive training and experience in the same domain who were given identical information, would follow different paths during a decision making process. Drawing on my own experience I knew that business consultants, for example, often employ different strategies to achieve the same goal when acting on identical instructions. I had observed that this behaviour appeared to reflect the idiosyncrasies, or personal disposition of the consultant. Could it be that behavioural characteristics, not training, or the setting determined the path? This idea appeared to be a plausible explanation. Therefore, I chose to examine my research topic from a perspective suggested by Shanteau (1987).

While attempting to focus my research I read Shanteau's (1987) work on the psychological characteristics of expert decision makers, and noted his comment that while "... most research is based on formal analyses of objective decision properties. There has been little corresponding effort to analyze more subjective characteristics of experts." (p. 297) [emphasis added]. Shanteau's comment was like that of Einhorn's, an addendum to his main thesis. Shanteau is an outstanding scholar in the study of experts, and I believe that it is reasonable to conclude that he included this 'aside' because he valued it.

Shanteau's reference to the subjective characteristic of experts indicated to me that my own observations while working in a management role as mentioned earlier, may warrant further consideration. Although I refer to both authors' comments through out my thesis, it is to emphasise the importance that I attach to their comments rather than to use their comments to support my argument. My motivation, as stated earlier, existed before I read the comments I have referred to; however the statements were invaluable to me as I tried to focus my research.

1.3 Research Perspective

As with all researchers I have a particular perspective based on an ontology formed by my background and personal beliefs, which determines the epistemology that I accept, and the procedures that I comfortably follow. These characteristics are the value laden-ness associated with any scientific research (Chalmers, 1982), and need to be recognised and declared (Lewins, 1993). I have for many years been involved in business management, and this experience has led me to study management theory. In addition, I have a long-standing interest in psychology, both as an academic and as a practitioner in human resource management. Undoubtedly, the prior interests that I have mentioned contribute to my research perspective.

In addition to my stated prior interests, my belief system is obviously influenced by what I accept as rational. Although my early education emphasised the traditional, quantitative or objective style based on cause and effect, and I obviously retain that knowledge, I now prefer a qualitative point of view. The new viewpoint accepts contextual values, allows for the researcher's perspective, and dismisses causality as a mental imputation (Denzin & Lincoln, 1998; Easterby-Smith Thorpe, & Lowe, 1991). Therefore, according to the current philosophies on research paradigms, I would describe myself as a constructivist.

Being a constructivist implies the adoption of a relativistic ontology. Relativism accepts local and specific realities in the form of multiple socially and experientially based mental constructions. To a constructivist ontology is inextricably intertwined with epistemology, because the researcher or ‘investigator’ and the ‘investigated’ “are assumed to be interactively linked so that the ‘findings’ are literally created as the investigation proceeds.” (Denzin & Lincoln, 1998, p. 207). As a consequence of this ontological and epistemological position, the research procedures require an interaction between investigator and respondent in order to interpret the respondent’s mental constructions. Therefore, my research relies on hermeneutical techniques and dialectical interchange. Simply put, I intend to use the well-established observational case study methodology, which is based on interpretation and discussion, to learn about individuals’ interpretations of what takes place in specific settings (Lincoln & Guba, 1985).

1.4 Focus

My declared research perspective, particularly the interest in management and psychology, requires a research topic that is placed in a suitable management context. The focus is, therefore, on the role of experts’ behavioural characteristics in managerial decision-making situations. The unit of analysis is an expert functioning in a managerial role.

Experts are defined in the literature as people with extensive training, experience, and skill. It is generally accepted that a minimum of ten years is required to become a domain expert (Ericsson, 1997; Shanteau, 1987). It is also accepted that expertise requires excellent decision processing (Hammond, Hamm, Grassia, & Pearson, 1987; Simon, 1987; Ericsson & Charness, 1994). In accordance with these definitions, it seems reasonable to expect that experts’ decision-making processes are firmly established, likely to be stable and consistent, and unlikely to be greatly influenced by external factors.

Experts, rather than non-experts, are the unit of analysis because they bring to a managerial role strongly developed decision-making skills that are unlikely to change due to pressure from the managerial role. Additionally, experts have apparently followed their personal disposition to become an expert, and to move into management. Therefore, these people are likely to display a strong preference for acting according to their behavioural preferences.

1.5 Why is this study important?

The question asked in this research is important because recent work by an number of authors has strongly indicated the requirement for a greater understanding of the human behaviour associated with decision-making (see for example Isenberg, 1984; Klein, Orasanu, Calderwood, & Zsombok, 1993; Haley, 1997; Lipshitz, 1994; Shanteau, 1987).

Furthermore, there appears to be a distinct lack of qualitative research in the literature relating to experts, management decision-making, and perhaps to a lesser extent human behaviour. Quantitative researchers frequently present the research community with findings derived from experiments, questionnaires, and studies of large groups. This research more often than not does not address individual behaviour, context, and the natural setting (see for example Davis, Grove, & Knowles, 1990; Doktor & Hamilton, 1973; Nutt, 1998; Willemain, 1995).

My study follows a constructivist, qualitative methodology which I believe enhances the value of the response to the research question. The choice of methodology is significant because it creates an opportunity to provide new knowledge from a new perspective. This new perspective can be seen as an important attempt to triangulate with existing knowledge to either confirm or confound existing hypotheses. Furthermore, given the marked absence of

qualitative research identified above, this study helps to fill a significant methodological gap.

One final important reason for conducting this study is that an understanding of experts' decision-making may provide knowledge that can be used prescriptively to improve the decision-making of non-experts. If non-experts are informed about the decision-making processes of experts then they may learn from, and adopt experts' decision-making processes to, themselves, make better decisions themselves. The possible benefits justify an attempt to gain new knowledge about how and why experts act as they do.

1.6 The study

At the outset this study attempted to explain the decision-making processes of domain experts who have become business managers. Domain experts are defined as people, who over a period of at least ten years have developed knowledge, experience, and skill in a particular field to a level sufficient to achieve the recognition of expert status by their domain associates.

The constructivist, qualitative methodology adopted takes the form of four case studies. In each case the respondent is an acclaimed domain expert who has chosen to take on managerial responsibilities. However, each case is unique. The expert's domain expertise is different, as is the managerial role, and the setting.

1.7 The main findings

As a result of my research I have obtained four important insights that lead to a better understanding of experts. A synopsis of each follows. The first, and second

findings are a direct response to my research questions. The third and fourth are issues that I have recognised as important during the analysis of data. Overall there is some suggestion that certain facets of expertise can be generalised across domains, as obviously can the definition of an expert, but this in no way implies that the performance of the experts studied in this research is in its self able to be generalised. This research appears to support domain specificity, which will be examined in more detail later.

1.7.1 Experts behavioural characteristics appear to dominate

In each of the four cases the expert's behavioural characteristics appear to completely dominate his/her actions. There are clear examples that the experts process information in a decision-making situation according to their personal view of the situation faced. The goals pursued by experts appear to be totally determined by their idiosyncratic behavioural characteristics, and are then satisfied by the selective application of knowledge and experience as determined by their behavioural characteristics.

1.7.2 Expertise may be transferable

Facets of expertise, such as analytical decision-making skills, appear to be appropriately used by experts outside of their domain of expertise. This finding contradicts indications from other research which suggests that outside of their domain of expertise experts are no better than novices (Camerer & Johnson, 1991; Carroll & Johnson, 1990). This ability is particularly evident in two of the four cases where the experts' managerial roles require them to make decisions that are largely outside their domains of expertise. In both instances the respondents satisfy the role requirement by using their highly developed analytical skills. However, the respondents' adaptive capacities are representative of their personal behavioural characteristics. This observation appears to give further support to the proposition that personal behavioural characteristics determine the decision making path followed, and suggests that experts with differing dispositions may not act in the same way.

1.7.3 Expertise aligns with behavioural characteristics

In each of the four cases, expertise seem to be clearly aligned with the expert's behavioural characteristics. The respondents' natural dispositions appear to have guided them toward their domain of expertise, and in each case the expert's decision-making processes indicated a characteristic style. Additionally, the expert's behavioural characteristics indicated that the expert would adopt specific decision-making processes, which suggests that the attainment of particular expertise may be associated with behavioural characteristics. Although the possibility that this link, in the form of genetically inherited behavioural characteristics, may exist is acknowledged by Ericsson and Charness (1994), my research presents the first empirically obtained data to support the existence of this association. The decision-making processes of the four experts in my study appear to be strongly determined by their innate abilities and/or capacities in the form of personal behavioural characteristics.

1.7.4 An apparent dichotomy in decision-making

A clear separation in decision-making processing appears to take place between decisions that directly involve people, and other kinds of decision. In all four cases it is clear that the respondents believe that decisions, which directly involve or affect people require greater consideration. The respondent may be a 'people person' who tries to ensure that the people for whom he/she is responsible are treated appropriately, or one who recognises that his/her goals are best achieved through the co-operation of others. Whatever the reason, the distinction was both obvious to the observer and acknowledged by the respondents.

1.8 Limitations

There are four particular limitations to this study that must be acknowledged. First, three of the four respondents were known to the researcher before the study. However, they are respected experts in their field and unlikely to allow their

professional integrity to be compromised by my research requirements, so there should be no suggestion of bias. Secondly, as is clearly stated in the research procedures chapter, this research is a constructivist, qualitative study, and as such does not imply transferability (generalisation) although it may be possible. Thirdly, because the respondents are experts in different domains of expertise no attempt is made to compare their expertise, only their decision making is considered. Fourthly, as the interpretation of the research findings is largely dependent on the researcher's idiosyncratic perspective of events and issues, other interpretations of the data must be expected.

1.9 Thesis overview

There are nine chapters in this thesis. The first chapter titled Introduction is a prolegomena, a formal critical introduction to this work. It begins with a statement about the aim of the study and its subsequent presentation in this thesis, then there is an explanation of the motivation for the research. The chapter continues with an statement about the research perspective followed by an explanation of the research focus. Next, the issue of the importance of the research topic is addressed followed by a brief review of the study's main findings and the chapter concludes with a statement about the limitations of this research.

Chapters two, three, and four form the literature review component of the thesis. Chapter two examines the term expert, with the intention of establishing experts as a credible unit of analysis. Credibility in this instance implies the consistent, reliable presentation of skills such that any inconsistencies in decision-making can be confidently assumed to have been caused by external factors. This distinction is particularly important. With experts it is assumed that extensive training, knowledge, and constant practice in their domain specialisation will ensure that they have developed a strong, persistent, and almost unshakeable faith in their own ability. This faith is such that when the decision-making processes of experts are studied, the activities can be confidently ascribed to expertise, or contextual factors such as managerial role, or to idiosyncratic behavioural characteristics. Without the established abilities of the experts that form the basic unit of analysis, there would be a need to consider several additional factors, such as the

respondents' decision-making skills, their experience, their ability in the role, and their training. However, by making experts the unit of analysis the importance of these variables has, as much as is possible, been eliminated because they are essentially part of expertise.

Chapter three discusses the decision-making literature. This chapter examines pertinent decision theory; in particular it considers several perspectives on decision-making, and then looks at how decisions are made. Having previously established, in chapter two, that experts are particularly good decision makers, the intent of this chapter is to examine the decision-making processes that are likely to be evident in an examination of expert decision-making.

Chapter four discusses behavioural factors. In particular the chapter considers the highly developed psychological characteristics that experts bring to their decision-making. The purpose of this chapter is just to identify the behavioural characteristics that can be expected to influence experts' decision-making, and the form that the influence may take, then to consider how those behavioural characteristics can be assessed. Included in this chapter is a consideration of the influence, and assessment, of personality and cognitive style.

Chapter five presents a synopsis of the literature review, then brings together some particularly interesting points identified during the literature review to build an argument in support of pursuing new knowledge in the area of a perceived lacuna. The lacuna in the literature is described, and research questions which attempt to develop knowledge that will close the lacuna are presented.

Chapter six discusses methodology. The research that is presented in this thesis is defined as being qualitative. Qualitative research has gained considerable respectability and acceptance in the last few decades, but is still considered to be developing. Consequently it appears to be prudent to describe in some detail what qualitative research implies for this thesis, and to define some terms and procedures. The chapter also identifies my position as the researcher, and the reasons for selecting the research procedures used in this research.

Chapter seven presents a ‘thick description’ (Lincoln and Guba, 1985; Denzin, 1998) of the four case studies. This chapter is a synopsis of the information that was obtained through interviews, observations, and psychological evaluations. Although it is a synopsis, the information presented is, I believe, sufficient for anyone interested to gain a good understanding of each case.

Chapter eight presents the analysis of the case studies. The cases are evaluated against the set of questions defined in Chapter 5 to provide appropriate information to answer my overarching research question. Not only is each case assessed, but there is also an assessment across cases. The chapter concludes with a summary of the research findings.

Chapter nine presents a summary of the study, the research design, and the research findings. The theoretical significance of the study is discussed, as are the possible wider theoretical implications of the study, and is followed by a statement on the study’s limitations, and opportunities for possible future research.

1.10 Some notes for the reader of this document

There is no other research on the topic covered in my research that I am aware of. Consequently, in presenting all the information that is required to understand the study, this thesis has become a rather large document (more than 96,000 words or approximately 337 pages at 1.5 spacing, plus references and appendices). It was, however necessary to explain in detail, citing relevant literature, what the specific topic is, and how I went about the study. This made it necessary to present a satisfactory review of the literature relating to experts, decision-making, behavioural factors and qualitative research, along with the thick description of the case studies, and an extensive evaluation of the findings. Nonetheless, I have tried to be concise where possible, and only enough information for a good understanding is presented in the thick description that makes up chapter seven.

For the reader who wants a quick overview, I suggest that reading chapters one, five, and nine should suffice. For a more detailed account of the study chapter eight should be included.

1.11 Chapter summary

The aim, focus, and motivation for the study that is presented in this thesis, form the opening sections of this chapter. The thesis is about how experts process decisions in a managerial role, and the research that underpins it is motivated by my long-standing interest in management and psychology. The study is considered to be important for two reasons.

- A number of authors have stated a requirement for research that considers human behaviour in association with decision-making.
- There is a deficiency in qualitative research reported in the literature relating to experts, managerial decision-making, and to a lesser extent human behaviour.

The research is a qualitative multiple case study of domain experts who have become business managers. The main findings of the study are as follows.

- The decision-making processes of the experts studied in this research appear to be shaped by several factors which seem to form a three-tiered hierarchy. The dominant force, within the hierarchy, appears to be the experts' behavioural characteristics. At the next level of the hierarchy, and subordinate to the experts' behavioural characteristics is the experts' training and consequent expertise. At the bottom of the hierarchy, and subject to the influence of both behaviour characteristics and expertise, is the decision context.

- The behavioural characteristics of the experts studied appear to have determined the expertise that has developed. This relationship may indicate that to develop true expertise there is a requirement for an alignment between behavioural characteristics and the requirements of the domain in which expertise is expected to develop, which could be described as an innate ability.
- Expertise may, at least in part, be transferable.
- Experts were observed to be consistent in their decision-making, with one noticeable exception. Experts persistently differentiate their decision-making processes in such a manner that they follow different processes for decisions that involve or affect people from those that have no human involvement.

CHAPTER 2



Experts

An expert is a man who has made all the mistakes, which can be made, in a very narrow field.

(Niels Bohr)

The quotation above is one example from hundreds made by famous people. This particular example is unusual because it was made by an expert. Niels Bohr was a Nobel prize winning physicist, and his comment provides an insight to many of the characteristics of an expert that are described in this chapter. The chapter draws on the extensive literature about experts to describe the features that define ‘experts’ and to explain why experts are an important research topic. Additionally, this chapter forms a foundation for the chapters, on decision-making and behavioural factors that follow (Chapters 3 and 4).

This chapter is divided into six sections. The first section addresses the importance of experts to society, and therefore as a research topic. Next, in section two, the question - ‘What is meant by ‘expert’? – is considered. There is no single definition of an ‘expert’ that clearly identifies one, so the question has no clear answer. Any consideration of the question raises further questions such as: What makes an expert? How do experts differ from non-experts? How should experts be defined? these questions become the topics of the remaining sections of the chapter.

2.1 Why are experts important?

When our society is faced with a difficult or unusual situation, the media often announces that ‘an expert will be called in’ to give guidance. Television news and newspapers frequently report that experts are being consulted by local or central government, or that a foreign expert is visiting to give advice on their specialist topic. The media’s headline announcement, ‘Experts Being Consulted’, is intended to attract the attention of viewers or readers, to generate revenue for the media businesses concerned. That they so frequently choose to use the banner headline ‘Expert’ clearly indicates a recognition that our society has a high respect for experts, and that the media expectation is for society to show an interest in the reporting of events involving experts (Shanteau and Stewart, 1992).

To the general public an expert is anyone who seems to know more than they do about a subject. However, the more qualified person is often more cautious when referring to a person as an expert. In acquiring knowledge, the qualified person is exposed to errors and pitfalls associated with gaining expertise (Simon, 1979; Ericsson and Charness, 1994). This can make them sceptical about the ability of others. Nonetheless, many highly qualified people do defer to experts. For example in a recent interview Karl Ludvigsen, a former senior executive with both the Ford and Fiat motor companies, answered a question asked of him by saying “*no I leave that to the experts*” (p. 132) (Thoroughbred and Classic Cars, 1995).

2.1.1 To better understand expertise

Due to their exalted position, experts are fascinating as research material. Some fields of research, notably psychology, appear to have attacked experts with an application of the ‘tall poppy syndrome’. They have only noticed what experts can not do (Edwards, 1992). However, experts have long been a source of inspiration for artificial intelligence studies and expert systems where experts are viewed in a positive light, and it is what they can do that is of interest (Simon, 1979). Although researchers developing artificial intelligence and expert systems, tend to examine expertise from their own perspective not that of the expert (Shanteau,

1992). A stance somewhere between the two appears to be more appropriate, if research into expert ability is to develop a beneficial understanding of expertise (Ericsson, 1997).

When experts are studied we are generally attempting to observe their actions within a defined field known as their field, or domain, of expertise. We are actually attempting to observe experts demonstrating their expertise. It is the possession of expertise that identifies people as experts, and it is their expertise that we need to study to be informed about experts' decision-making processes.

People who apparently are 'top performers' have been evaluated by academics, in numerous tasks, and found to be capable of superior performance, to perform no better than the norm, or to be no better than chance. This inconsistent record has lead some to suggest that experts are not really better than novices. (Camerer and Johnson, 1991; Edwards, 1992). As a consequence many researchers dismissed the 'expert' phenomena (Ericsson and Charness, 1994).

However, common observation of skilled performers has continued to support the conviction that experts are better performers than non-experts. Some academics, perhaps persuaded by the conflict between perceived expert performance and the evidence produced by studies of experts, have persisted with the research of experts, and found flaws in the early research methodology (Shanteau, 1988; Edwards, 1992). Explanation for the inferior outcomes focuses on three flaws in the evaluative process.

- First, 'inappropriate selection' of the expert. The person being evaluated may have appeared to be an expert, but was in fact a novice (Shanteau, 1995).
- Second, the task was 'outside their competence'. Expert competence is generally limited to a narrow, and specific domain (Ericsson and Lehmann, 1996).
- Third, the task was 'removed from environmental cues' consequently requiring the expert to work away from his/her usual working environment. Expert competence is frequently dependent on environmental cues that may

not be available to them in abnormal situations such as laboratory experiments (Einhorn, 1974). -

Although there is now sufficient evidence available to be confident of the existence of bona fide experts, instances of non-expert performance by people presumed to be expert will continue to be an important concern in the search to validate the existence of expertise (Shanteau, 1995).

2.1.2 Social dependence

Experts are particularly interesting because of our societal dependence on their expertise in so many fields (Shanteau and Stewart, 1992). All endeavours requiring a mix of knowledge, training, skill, and experience appear to produce people who out perform other participants, and thereby acquire a reputation for expertise. The quality of contemporary life is perceived to be dependent on experts in business, science, and in technology, plus numerous other areas in which expertise determine societies future. The literature on expert decision-making varies from condemnation to adulation, but is consistent in its continued interest in experts, because, as Shanteau and Stewart (1992) clearly indicate, “research on experts matters - both to researchers and to society at large”.

When we require the services of an accountant, an architect or an engineer we expect that person to be an expert in their field. They need not necessarily be the best in their field, but certainly capable of excellent achievement within the field. Anything less calls into question the person’s right to practice in their specialisation. We place this condition on the ability of any person that we turn to as an expert in their field. Virtually every area of expertise is associated with an hierarchical association based on social criteria (Ericsson, 1997).

2.1.3 Expert status is desirable

To be an expert is clearly a position of limited occupancy. This is because any task that is sufficiently complex to warrant expert competence will, by its nature permit few people to achieve expert status. Additionally the expert’s position will

be constantly challenged by other people aspiring to become experts. An expert that cannot defend his/her position by continuous accomplishment at the highest level risks displacement by one of the many aspiring 'experts'. Nonetheless, many people aspire to the title 'expert', because expertise that is valued by society brings to the expert many desirable rewards (Ericsson, 1997).

2.1.4 Experts are potentially a rich source of knowledge

Behavioural research often begins with the observation of a representative sample of a population. From this sample an understanding of normal performance may be obtained. Here, normal means the average (modal) person in the population. If the study is attempting to develop an understanding of specific characteristics, or abilities, intrinsic to the performance, then the population should be limited to those who can consistently produce, at the least, a very good rendition of the task. Axiomatically experts are that population (Ericsson, 1997; Shanteau, 1995).

A group of people who consistently produce better than average accomplishments, as experts do, is clearly a group that is rich in skill, and knowledge, specifically related to the task being observed. Therefore, if appropriate methods are applied to learn about those competencies a wealth of knowledge may be gained that has great implications for the benefit of the general population (Ericsson, 1997).

2.1.5 Experts as managers

I have not found studies of expert managers. It is probable that some studies of managers are studies of experts who have become managers but this has not been acknowledged. It must therefore be recognized that there are distinct limitations when trying to make comments about experts based on managers generalised performance.

Experts, as I argue later in this chapter, are proficient decision makers, an ability that, according to Simon (1960), is the most important skill for a manager to possess. Although there may be more to successful management than 'good'

decision-making, the ability to make skilful decisions is well recognised as an important part of management (Bennett and Felton, 1974; Lipshitz, 1994; Mintzberg, 1989, Simon, 1987). Therefore we can reasonably assume that because experts possess proven decision-making skills that they will be invited to take up management roles

However, we must also assume that experts in any field will bring to management more than expert decision-making, and that the other attributes will have an influence on their achievements as managers. Experts, such as scientists, teachers, and engineers, bring to management positions a strong personal background of training and experience that often appears to be lacking in specific management expertise, yet they are apparently successful in their new roles. Are the decision-making skills that are developed during the acquisition of their expertise the key to their success? Is managerial skill an integral part of expertise in some domains?

Experts have been studied in detail by academics, and the main function of this chapter is to evaluate that literature, however, little has been said about experts as managers. As a generic classification, managers have received considerable attention, and the literature relating to management and managers is vast, but a review is clearly beyond the scope of this thesis. Nonetheless, a brief consideration of the skills attributed to managers leads to the conclusion that, in many instances, experts will have incorporated similar skills into their expertise.

Managerial decision-making differs from personal decision-making in that it is guided by the “*managerial point of view*” (p. 1) (Bennett and Felton, 1974). Successful management is, according to Bennett and Felton distinguished by four important characteristics: (1) an understanding of organisational goals, (2) an ability to work with and through other people, (3) a willingness to accept responsibility, and (4) a strong rejection of the status quo.

The four characteristics identified by Bennett and Felton, have also been recognised as some of the distinguishing features of experts (Ericsson, 1997; Shanteau, 1987, 1992), and are discussed in some detail later in this chapter. Here, I believe it is sufficient to state briefly what features of expertise relate to those

characteristics. In experts the characteristics can be seen as an ability to recognise and to concentrate on what is defined as important to achieve objectives; a strong set of communication skills which enable them to interact skilfully with people; a strong sense of responsibility and a willingness to accept responsibility; a drive to achieve exceptional performance.

There has been much research into what ‘makes’ a good manager, with the intent of revealing the configuration, or shape of the effective manager (Bennett and Felton, 1974). However, the emphasis appears to have been on what managers should do rather than on what managers do (Mintzberg, 1980, 1989). Mintzberg (1989) attempted to correct this situation by identifying ten “*roles, or sets of behaviour identified with a [managerial] position*” (p. 15) that would define a manager’s work by virtue of his/her authority or status.

The first three roles identified by Mintzberg, figure head, leader, and liaison are interpersonal roles. The next three roles, monitor, disseminator, and spokesperson, are informational roles. The last four roles, entrepreneur, disturbance handler, resource allocator, and negotiator, are decision roles. Interpersonal, informational, and decision-making roles are also consistent with the expectations of expertise, as will be made clear later in the chapter.

Having identified ten roles that describe managers’ work, it becomes clear that “*the managers’ effectiveness is significantly influenced by their insight into their work*” (p. 22), and consequently Mintzberg concludes that three specific functions will determine the effectiveness of managers. First the managers must share privileged information with subordinates. Second, they must be able to distinguish what is most important from the chaos, select appropriate decisions to be made, and make use of suitable analytical procedures. Thirdly, managers must manage their time carefully to achieve important objectives.

The three functions that Mintzberg identifies are also clearly identified by Shanteau (1987) as characteristics of expert decision makers, as were Mintzberg’s ‘roles’ and the four characteristics identified by Bennett and Felton, both discussed earlier. There is therefore, good reason to believe that experts may be

well suited to appropriate managerial positions. Experts bring specific and highly desirable characteristics to a managerial role, and are potentially excellent management material (Simon, 1987). In addition to being able to detect domain specific cues, they possess well-calibrated judgement, and they have highly developed intuitive decision-making skills (Hammond *et al.*, 1987; Isenberg, 1987; Simon, 1987). Experts are people drawn from a huge pool of differing influences, and who possess a proven special skill or knowledge that has been accepted by their associates as excellent.

All the evidence suggests that experts are well equipped for the complex decision-making environment that is management (Mintzberg, 1989; Simon, 1987). However, as a note of caution it must be remembered that expertise has been shown to be domain specific (Ericsson and Smith, 1991). Experts who are capable of excellent achievement in their field of specialisation may only be able to perform as experts in managerial positions that require the same mix of skills. Experts who, as a result of their demonstrated expertise, are selected to be managers of endeavours outside of their specific domain of expertise risk the consequences of 'The Peter Principle' (Peter and Hull, 1969). However, it appears reasonable to assume that most experts will be sufficiently astute to recognise the boundaries of their own expertise and seek out other experts to provide information on decisions outside their expertise (Simon, 1987; Mintzberg, 1989).

As I stated earlier, there is little mention in the literature of experts who become managers. However, Maccoby (1987) identified 'expert' as one of four management styles; the others being protector, facilitator, and innovator. As a particular management style 'expert' appears to have inherent benefits and problems. Maccoby recognised two benefits arising from having experts as managers; experts value mastery of their task environment and they expect high standards without excessive managerial control.

The costs associated with experts who are managers according to Maccoby, is their tendency to be inflexible in team situations; experts may neglect to develop their subordinates; experts are inclined to view all problems as technical issues best solved by logic which creates difficulties when they need to cope with social

problems. The tendency to view all problems as technical issues, ignoring possible social issues is particularly evident at NASA, an organisation that employs a large number of experts (Maccoby, 1987).

The most important point that Maccoby makes I believe, is that the best managers are those who combine styles. Therefore an expert who can bring to management, not only expertise but also, well developed social skills to enable beneficial interpersonal activities to take place, is more likely to succeed as a manager than the expert who lacks such skills.

2.1.6 Summary

This section considered several features of expertise that make an expert important, including perceived social dependence on experts, experts as a rich source of knowledge, and the role that experts' can play in management. Experts are important because social criteria most often determines the value of expertise, consequently the characteristics that form an expert are important to society (and therefore academic research).

2.2 What is meant by 'expert'?

In common usage the word 'experts' loosely describes a subset of our society. At one extreme the subset contains people who know enough about a subject to impress less informed people who view them as 'expert'. At the other extreme there are 'expert' experts, people who know more about a subject than anyone, including other experts. Between the two extremes there are people with a range of abilities people who for various reasons are accepted as expert. It can therefore be said that this subset of our society contains a hierarchy of experts. Nonetheless experts are generally accepted to be a people who is know significantly more about a task than others who have not trained to perform that task (Berger, 1988). The English term 'expert' developed in the 14th century. Its derivation is the Latin word *expertus* - which defined a person 'known by experience'. This, in turn,

derived from the Latin word '*experiri*' - meaning to test or prove (Collins English Dictionary, 1992).

The psychologist James Shanteau has studied experts for many years. In a recent paper (Shanteau, 1995) he stated that he began his search for a definition of the word 'expert' by referring to Webster's (1979) dictionary. He found that it means, "*having, involving, or displaying special skill or knowledge derived from training or experience*" (p16). Shanteau states that he accepts peer identification when locating experts, however, he has defined experts as '... those who have reached the pinnacle of their profession.' (1988), and '... those who have been recognised by within their profession as having the skills and abilities to perform at the highest level.' (1992). I referred to the Collins English Dictionary (1989) and found a similar description to that in Webster's, "*a person who has extensive skill or knowledge in a particular field*". The key difference is that Webster uses the term 'special' whereas Collins uses 'extensive'.

Apparently, over time the literal definition has changed, as we have seen. The contemporary literal definition of 'expert' does not include experience. This omission is, perhaps, understandable, because colloquial English is not as precise as that used by academics; dictionaries are for the "*general reader*" (p. vii) and must reflect common usage (Collins English Dictionary, 1992). For most purposes the literal definition of an expert will suffice. However, academic research often requires a more rigorous definition to constrain its study of experts to particular aspects of their abilities (Einhorn, 1974; Shanteau *et al.*, 2001). This line of thought will be pursued in the question - 'how can experts be defined?'

In general terms the designation expert denotes a person who has special and/or extensive skill or knowledge in a particular field. More specific definitions may be necessary for academic research, and this will be attended to in the last section of this chapter.

Now that experts have been defined in general terms the question of what circumstances or events conspire to form an expert can be addressed.

2.3 What makes an expert?

Is an expert a person who has a natural ability, or one who has had appropriate training? Perhaps to be an expert requires a mix of both. History records that many people have demonstrated outstanding ability and as a consequence been acclaimed as gifted. But history tends only to record the achievement leading to the acclamation, not the prior history that may explain the acquisition of the ‘gift’. Genius, talent, gift, and expert, are nouns that have on occasion been used interchangeably to describe people who display outstanding abilities (Ericsson, 1997; Eysenck, 1995; Jensen, 1996). Until early in the 20th century, experts were thought to be people with a gift or special talent, and much of the research concentrated on detecting innate ability.

2.3.1 Innate ability

Sir Francis Galton’s (1892/ 1972) study of eugenics appears to be the first empirical examination of outstanding human performance. Galton considered genius to be an inherited characteristic. Galton was a cousin of Charles Darwin, famous for his work, ‘On The Origin of the Species’ (1859), and there are indications that the Darwin family lineage did display inherited genius (Lykken *et al.*, 1992). The grandfather of both Charles Darwin, and Francis Galton, Erasmus Darwin, was acclaimed as a physician, poet, and author. Also Charles Darwin’s son Sir George Darwin was an astronomer and mathematician, distinguished for his work on tidal friction.

Galton displayed the family characteristics; he was an explorer and scientist; he founded the study of eugenics, and the theory of anticyclones (Collins English Dictionary, 1992). It appears clear now that family connections influenced Galton’s perception of the true value of inherited ability, and that he reached conclusions that cannot be supported, however his work is still considered to be important (Eysenck, 1995). Galton claimed that great achievement is based on innate ability, motivation and a great deal of hard work (Galton, 1892/ 1972). It was his belief that training and persistent effort are necessary to reach the

boundaries of personal achievement, although the boundary is predetermined by inherited, innate, ability (Darlington, 1972).

Galton's fundamental claim that achievement is based on innate ability, motivation and a great deal of hard work, is now widely accepted (Ericsson and Charness, 1994). However, despite the enormous weight of evidence that Galton produced to support his theory of eugenics it was not fully accepted. Many of Galton's claims relating to inherited characteristics have subsequently been refuted (Eysenck, 1995), and some people, including many psychologists, continue to dispute the innate ability aspect of his theory (Ericsson, 1997). This is the 'nature/ nurture' controversy, discussed briefly at the end of this section. People who do not accept that 'nature' predetermines human ability, prefer the premise that it is 'nurture' that develops outstanding ability.

2.3.2 Behaviourism

By the turn of the century there had been a radical change in perspective relative to ability, particularly in psychology. The idea that ability was predetermined by inherited characteristics was largely rejected in favour of behaviourist theory that assumes all action is a response to our environment. John Watson, the founder of behaviourism, argued that humans were at rest until acted on by a stimulus (Medin and Ross, 1990). He argued that the stimulus aroused the person and caused the subsequent behaviour. The behaviourist's perspective on human activity has people automatically moving toward a goal in response to environmental stimuli, rather than initiating a particular behaviour to achieve a desired objective. Of all behaviourists the most radical, B. F. Skinner, has also been the most influential. Skinner's behaviourism theory is mainly based on empirical fact (Medin and Ross, 1990). It assumes that human behaviour is a response to the environment, which can be manipulated and controlled to stimulate outcomes. The analysis of behaviour, in terms of observable events, has been used to formulate empirical laws (Skinner, 1974; Weiner *et al.*, 1977).

2.3.3 Cognition

The development of cognitive psychology in the 1950's saw a move away from behaviourism, toward the middle ground between the theories of Galton and Skinner. Cognitive psychologists accepted the empirical methodologies that had been firmly established, but questioned the absence of research into mental processes. In the early nineteenth century Freud developed extensive theories related to mental processes (Weiner *et al.*, 1977). However, his purpose was different from that of the emerging school of cognitive psychology. Psychologists, that is cognitive psychologists, wanted answers to phenomena such as social judgement, coping strategies, and perceived responsibility.

The theory, proposed by Kelly (1955), that prior experience and social context determine how we construe the world was a major step forward and brought psychological theory relating to personality to its current status. Kelly saw that our actions are more than the result of physical stimulus; they are determined by personal perception and interpretation of events. Many psychologists, perhaps most, accept Kelly's theory that the average person is an intuitive scientist, striving to predict and understand behaviour. It is considered normal to formulate hypotheses about our world, and then to alter our conception of the world in accordance.

By structuring our perceptions of the world, we are able to anticipate events and to master our environment. People are motivated to achieve cognitive clarity, and construct systems that make the world (their environment) understandable. There is no 'best' conceptual system, nor any that cannot be modified, because we choose how to interpret events (Kelly, 1963). The theory of Personal Constructs produced by Kelly has been extensively applied to management research, and there are many variations of his original Repertory Grid Technique in use (Fransella and Bannister, 1977).

2.3.4 Nature/nurture

It needs to be noted that the nature/nurture argument is no nearer to resolution. In many activities there are particular physical or cognitive abilities that will predispose a person toward success. These activities can be seen to favour the nature argument. However, there is some evidence, particularly in musical expertise, that ability may not be determined by natural aptitude. Modern teaching methods are enabling very young children to achieve results that were previously considered to be possible only by gifted pupils. This research is specific to music, an activity that is largely based on repetitious practice, and may not be applicable to other disciplines (Gardner, 1983; Ericsson, 1997; Ericsson and Charness, 1994; Eysenck, 1995).

2.3.5 Further consideration of innate ability

Earlier in this section Galton's work on innate ability was discussed, here I consider the work of Ericsson and Charness (1994) which relies heavily on the premise that expertise is an acquired ability, but admits that there may be some mediating variable that has not been considered. As Ericsson (1997) acknowledges, appropriate and extensive practice does not always lead to expertise. Nonetheless, Ericsson and Charness do not appear to accept that failure may be due to lack of appropriate ability.

Perhaps there is some mediating variable that has not been considered. Is there some special feature that permits expert ability to form? Ericsson and Charness (1994) suggested that if this link exists, it could counter their argument that expertise is acquired through extensive, specific, and deliberate practice, and that there is no requirement for innate abilities or capacities.

Although, Ericsson and Charness (1994) strongly support the proposition that expertise is a completely learnt attribute, they do acknowledge "*one critical flaw*" (p. 744) in the evidence on expert performance. The people who achieve expert status "*are not randomly assigned to their training conditions. Hence one cannot rule out the possibility that there is something different about those individuals*

who ultimately reach expert-level performance” (p. 744). Nonetheless, they consider a requirement for innate ability and capacity to be inconsistent “*with the reviewed evidence*”. They go on to state “*More plausible loci of individual differences are factors that predispose individuals toward engaging in deliberate practice and enable them to sustain high levels of practice for many years*”. Ericsson and Charness suggest that this predisposition may be due to environmental factors, or that “*preferred activity level and temperament may have a large genetic component. Furthermore, there may need to be a good fit between such predisposing factors and the task environment for expert level performance to develop*” (p. 744). There are two important issues here. First, if there is any possibility that there is something different about people who become experts, and if those individual differences predispose those people towards the achievement of expertise, then how has the possibility of innate ability been eliminated? Second, if goodness of fit between the predisposing factors and the task environment are at all critical, then extensive, specific, and deliberate practice alone seems unlikely to result in the acquisition of expertise.

In addressing the first issue, concerning innate ability, it is interesting that Ericsson and Charness suggest that a genetic component may account for a person’s disposition, while at the same time discounting the possibility of innate ability. Both are by definition present at birth, and it is difficult to distinguish between the two. Nonetheless, whether they are genetic or innate appears to be less important than the acceptance that behavioural characteristics are fundamental determinants of how expertise is acquired. There is evidence that a hereditary, or genetic component does account for behavioural characteristics derived through the configurable model of genetic inheritance (Eysenck, 1995; Lykken *et al.*, 1992). Therefore, the idea that genetic inheritance can account for at least some aspects of expertise appears to be valid.

The second issue arising from Ericsson and Charness statements, goodness of fit between the predisposing factors and the task environment, builds on the first. If the acquisition of expertise is dependent upon the existence of some predisposing characteristics then either of two possible situations may exist. First, if experts are in some way collectively different from other people in respect to the acquisition

of expertise, but otherwise the same as one another then it may be expected that extensive, specific, and deliberate practice could be the only requirement for the acquisition of expertise. However, this would suggest that all experts have the same predisposition, and this is simply not acceptable.

A second, more plausible explanation for the goodness of fit, would accept that the similarity between experts can be defined by their collective difference from non-experts, while also accepting that experts are different from one another. Different in that they possess an idiosyncratic predisposition, which will determine their goals and the distinct paths they will follow to achieve those goals (Eysenck, 1995). Environmental factors such as socio-cultural influences, location, and opportunity will undoubtedly influence the possibility of an individual becoming an expert, as will the effort that is applied to its achievement, but without the predisposition, be it genetic or innate, the development of expertise appears to be less likely to occur.

2.3.6 Summary

A combination of natural ability, motivation, training, and plenty of hard work apparently make an expert. The literature does not clearly indicate that there is any hierarchy within the requirements although it seems clear that the last three alone can produce a degree of expertise (Ericsson, 1997). However there is also strong argument to suggest that the presence of natural ability, along with a willingness to work hard for the attainment of expertise, enables superior performance (Eysenck, 1995).

In the context of my research, Kelly's (1955, 1963) theories, in conjunction with the cognitive style theories discussed in Chapter 4, may help to develop a new perspective on the decision-making process of experts. Experts may be people who have exceptional cognitive clarity and consequently superior understanding of their environment (their world), due to the appropriate alignment of their personality and cognitive style with their personal interpretation of events. [Aspects of cognitive psychology and pertinent research from the literature are considered in Chapter 4]

In the previous section experts were explained in general terms. This section has examined the makeup of an expert in terms of how experts occur. The following section examines the characteristics that distinguish experts from others.

2.4 What separates experts from non-experts?

Experts' display defining characteristics that are evident to informed observers (Camerer and Johnson, 1991; Ericsson, 1997; Ericsson and Charness, 1994; Ericsson and Lehmann, 1996; Shanteau, 1995; Simon and Chase, 1987). Within their domain of expertise, experts usually make better decisions than non-experts (Simon and Chase, 1987). That experts' make better decisions should be expected given the general definition of 'expert' mentioned earlier. However, some researchers claim to have found contrary evidence to show that experts do not consistently make better decisions (Carroll and Johnson, 1990). This distinguishing feature of experts decision-making ability is examined shortly. It is followed by a consideration of why experts are different from non-experts, and an examination of some of the abilities that enable experts to perform better than non-experts' by working 'smarter'.

2.4.1 Experts are different

There are differences between expert and non-expert decision-making that become clear when the two are observed working on the same problem. Obviously experts have superior knowledge and experience within their domain of expertise, and this provides them with a greater understanding of problems that will be faced. However, it is how they use their expertise that sets them apart. Non-experts tend to be goal specific, and work backwards from the goal in their search for a solution, as do researchers when attempting to explain an outcome (Simon, 1987). Goal specific decision-making implies moving away from the problem incrementally, so not lose the direction, in search of the solution.

In contrast experts have developed the ability to identify the appropriate path to a solution and process available information in a general, non-goal specific manner, while working towards their objective (Baron, 1988). As a simple example if a non-expert were to be faced with a problem requiring the construction of a machine, then the search procedure would probably require taking the machine apart to understand how it works. An expert would be familiar with the machines workings and therefore be able to select appropriate components to construct a similar machine. This analogy also demonstrates another subtle difference between expert and non-expert. The expert may use his/her prior knowledge to build a replacement machine that incorporates improvements or refinements over the original. The non-expert would need to disassemble the machine to build an identical copy, and would be unaware of any alternative construction possibilities.

2.4.2 More appropriate decision-making

As the example above demonstrates, the two distinct problem-solving methods mentioned tend to be mutually exclusive. Working backwards, known as means/ends problem solving, is goal specific and does not build experience in general problem solving. The method prevents the development of a history of problem types by decision makers, but it does ensure that they will attempt to reach a solution in the most direct way possible (Baron, 1981). Experts, with a history of problem solving to call on, will tend to be ‘mechanistic’ in their approach to a solution. They will work through the established procedures that make up their expertise to determine a ‘good’ solution to satisfy the problem, but it will not necessarily be the ‘best’ solution. On occasion, their solutions may be technically less efficient than those produced by goal specific search procedures, but because of their expertise the solution will be arrived at more quickly and will possibly be more appropriate because the decision will, for instance, make better use of resources.

2.4.3 Limitations

Working towards the problem allows the expert to identify and match problems and solutions for future use, but it does tend to lock the expert into ‘tried and

trusted methods' when new, possibly quicker, or better solutions become available. Baron (1988) suggests that this may be the cost of expertise. However, working backwards may be the only suitable method for solving new problems for which prior knowledge or experience is not available. Furthermore, the knowledge gained from working backwards does not readily transfer to the non-goal specific mode of problem solving used by experts, which is demonstrably more versatile.

2.4.5 Generalisation rather than specialisation

The non-goal specific mode of decision-making that is a feature of expertise is particularly interesting. It unexpectedly, but clearly, demonstrates that although experts are specialists within a very narrow field of expertise, they use generalities to search for answers to problems within their specialisation, not specific solutions unique to the problem faced. In contrast non-experts are forced to use problem specific solutions because they cannot draw on the breadth of information that is available to the expert.

In summary experts are different not only because they possess greater knowledge and experience than non-experts but also because in general, experts have more appropriate decision-making skills enabling them to produce better-processed decisions. Better-processed decisions tend to be more accurate (see calibration below), and more consistent (Isenberg, 1986). Additionally, experts may focus on different information and/or use different strategies to perform a task, so experts cannot be thought of as being merely faster and more efficient than novices. Expert performance is based on different processes. As their expertise has developed, the expert's decision-making skills have evolved to use a different methodology (Hammond *et al.*, 1987; Simon, 1987; Ericsson and Charness, 1994).

2.4.6 Experts form accurately calibrated decisions

Calibration, that is good calibration, is dependent on background knowledge, and an ability to relate that knowledge to the problem faced. Therefore, experts can be

expected to have the appropriate knowledge within their domain of expertise. Experts are able to assess the accuracy of the decisions that they make, as they make them (Camerer and Johnson, 1991). They gauge the answer against their intuitive grasp of the probable answer (Einhorn, 1974). This is a facility that was demonstrated by mathematicians, engineers, architects, and many other people who used a slide rule to make calculations before the advent of the pocket calculator. Slide rules required the user to insert decimal points, a function that required an intuitive grasp of an approximate answer. This awareness of probable outcomes, known as calibration, is an important component of the consistency of expertise, and distinguishes experts from others, because most people are not well calibrated (Kleindorfer *et al.*, 1993).

Earlier I noted that experts use generalities to work towards the resolution of a problem. They intuitively use their thorough understanding of the domain to identify diagnostic cues, and appropriate heuristics to guide them through the decision process towards the best solution (Simon, 1987; Ericsson, 1997). Intuition, cues, and heuristics are an important part of the expert's makeup, and justify further discussion.

2.4.7 Intuition

It is generally recognised that intuition plays an important role in an individuals' decision-making. Decision makers frequently rely on their own judgement without reference to the processes developed through decision theory (Lipshitz, 1993). Experts follow this pattern. Consequently, while acquiring their expertise they can be expected to develop an ability to apply their knowledge intuitively. As a result experts will tend to rely on their own judgement, based on their expertise and extensive passed experience, without reference to decision-making aids. This reliance on intuitive decision-making frequently produces exceptional results, although disastrous results are not uncommon (Shanteau and Stewart, 1992; Targett, 1996).

Expert intuitive judgement may be a combination of heuristics, identification of diagnostic cues, weighting information, and other analytical methods that have

become sufficiently incorporated into the expert's decision-making processes that they appear to be intuitive. (Hammond *et al.*, 1987; Simon, 1987). This 'automated expertise' (Simon, 1987; Schoemaker and Russo, 1994) would enable the expert to make decisions that are apparently intuitive, because the complex decision-making processes that the non-expert would refer to, have become part of the normal thinking process for the expert. Furthermore, because the expert is conversant with a diverse range of decision-making skills, and applies them appropriately through intuition, their expert intuitive judgement can actually be superior to their formal analytical analysis. This facility enables an expert to anticipate formal calculations and to accept or reject them on the basis of their intuitive judgement (Hammond *et al.*, 1987; Hammond, 1996; Simon, 1987).

Intuitive decision-making is quick and simple. However there are two flaws commonly associated with intuitive decision-making. Whether an expert or a non-expert makes them, random inconsistencies and systematic distortion may be present in decisions that are based on personal judgement, (Schoemaker and Russo, 1994). [Random inconsistencies and systematic distortion are discussed in greater detail in Chapter 3.]

Although there are numerous published studies of expert decision-making (Ericsson and Charness, 1994), our understanding of why a person who possesses expertise is consistently able to transcend the achievements of apparently equally qualified people is still a mystery. Simon has told Mintzberg that the answer lies in habituated analysis, but Mintzberg is sceptical and prefers to consider the possibility of additional, as yet unidentified abilities (Mintzberg, 1989). It is perhaps because of Simon's interest in artificial intelligence, and his need to capture complete thought processes that he is, as Mintzberg states, unwilling to accept the notion of intuition as something other than grounded habituated analysis. Ericsson and Charness (1994) align with Simon, and suggest that the explanation is lengthy and specific practise.

2.4.8 Cues

Diagnostic cues are indicators or signals that contain important information related to a problem, and an expert becomes adept at recognising them (Ebbesen and Konečni, 1975; Einhorn, 1974). Cues identify and delineate the problem for the expert, and are probably the first indication that there is a problem. Cues may relate positively or negatively with one another. Understanding this and being able to predict the effect of the relationships is an important feature of expertise. Experts, due to their familiarity with the environment, their domain of expertise, are adept at detecting cues. However, experts' treatment of cues will differ. Experts follow different paths to acquire their expertise; as a consequence their experience and training may cause them to process information differently. A distinction here is important, an assessment of domain constraints and requirements form part of the recent developments in the study of experts, and this point is reinforced later under in the discussion about the desirability of a general theory of expertise (J. Shanteau, personal communication, September 29, 2000). Nonetheless, all experts tend to cluster information. Experts group similar cues, or give them similar ratings to ease the information processing; a coping strategy to contend with bounded rationality (Newell and Simon, 1972; Simon, 1979, 1982). In the process of identifying and grouping cues, the expert is measuring the 'amount' of the cue. Many cues are not quantifiable, quality, taste, and smell for example, but the expert has to assess the 'amount' of the cue so that the degree of influence can be assessed. (Gaeth and Shanteau, 1985; Kleindorfer *et al.*, 1993; Phelps and Shanteau, 1978).

The presence of cues permits an appraisal of expert performance (Einhorn, 1974). By evaluating the use of cues, internal validity, construct validity, and judgmental bias can be tested. Internal validity is a measure of the expert's ability to reproduce an assessment based on the cues. High internal validity, or repeatability, is a measure of decision-making reliability, and is clearly a requirement of expertise.

Construct validity in this instance refers to the process that the expert constructs to enable decision-making to proceed. Validity of the construct (process) requires

that the expert's decision-making processes lead to appropriate solutions. By accepting construct validity based on appropriate solutions there is an allowance for differences in training and experience that experts have when acquiring their expertise. Experts will in all probability develop different constructs, or processes, to evaluate information, but they will lead to similar solutions. This is convergent discrimination (Einhorn, 1974).

Construct validity should also display discriminatory validity in multidimensional decisions. When dissimilar information is processed the outcome should also be markedly different. For example the correlation between assessments of the same cue by different experts should be higher, than the correlation between the assessments of different cues by different experts (Einhorn, 1974).

Cue detection and information structuring are important diagnostic functions for evaluating information, and Cues are also important features of cognitive perception; Chapter 4: Cognition, will consider both.

2.4.9 Heuristics

Herbert Simon is well known for his theories of bounded rationality, which refer to the constraints on the information processing ability of managerial decision makers (1976). Simon is drawing attention to the fact that decision-making is very complex, and requires an ability to find, and use, heuristics that permit huge spaces to be searched very selectively (Simon, 1978). Heuristics are particularly relevant to the expert. Throughout the process of developing expertise an expert will be exposed to existing heuristics, and as an expert they can be expected to have created heuristics of their own. Intuition and personal heuristics are what Simon refers to as analytical skills that have become absorbed by the expert to the extent that they are automatic and can be used without conscious effort (Simon, 1987). [Heuristics are considered in more detail in Chapter 3]

2.4.10 Experts make better decisions

Experts are specialists. They work in a specific, often narrow domain. Experts concentrate their efforts on mastering the skills required to be an expert. Consequently experts' abilities are confined to the specialised narrow domain in which they are acquired; their skills are domain specific (Ericsson, 1997). It is therefore reasonable to expect that, because they are masters of their domain, the decision-making of experts will be better than that of non-experts who are not as familiar with the domain. Reliability, validity, and consistency of expert's decision-making have been examined in the performance of bona fide experts working in many different roles. Three examples are often quoted; the study of parole decision makers by Carroll *et al.* (1982), the study of court judges by Ebbesen and Konečni (1975), and the study of pathologists by Einhorn (1974). These studies have acquired some importance within the literature, and therefore warrant further consideration here.

2.4.11 Parole decisions

Carroll *et al.* (1982), considered the performance of parole interviewers' predictions and found that it was not good, and could easily be bettered by mathematical models. This study is interesting because it finds that all the variables but one, considered by the parole interviewers were valid predictors of the future performance of parolees. Prison conduct was the one variable that appeared to cause the parole decisions to be inaccurate, yet it was shown that prison conduct did not correlate with parolees' performance.

The study showed that the parole interviewers decisions and consequent parole recommendations were based on subjective judgement not on a database of facts. Additionally many of the judgements were based on an assumed relationship, not on a definite correlation. All parole decisions considered as a matter of course the parole applicants' behaviour while incarcerated; it was an essential part of the parole decision system. This occurred despite the absence of any demonstrated link between behaviour while incarcerated and future criminal action. The only identified correlation being an inclination toward nonconformity. Additionally,

parole interviewers' predictions, in their domain of expertise, were found to be consistent and fundamentally accurate. The processes followed were consistent, and decisions made were good. However, the parole interviewers' performance was clearly constrained by a parole system that ensured bad outcomes by requiring a flawed weighting system to be used in the decision-making process.

The use of scientific mathematical tools devised to predict outcomes provided only limited accuracy (Carroll *et al.*, 1982). However, even though the actuarial model used as a comparative measure did provide slightly better predictions than those of the parole interviewers Carroll *et al.* concluded that scientific prediction was no better. They suggest that at best actuarial models may moderate the 'apparently' less accurate subjective judgements made by decision makers. It is possible that their choice of the word apparently is an acknowledgement that it is not a legitimate comparison, having used different information in their actuarial model from that available to the parole interviewers.

The decision process followed by the parole interviewers was seen to be flawed, and should not therefore be used as an indictment against expert decision-making. The parole interviewers demonstrated the computer jargon 'garbage in, garbage out'. As a result of the study by Carroll *et al.*, the Parole Board changed the criteria for parole decision assessment to consider specific misconduct and rule breaking while incarcerated. The intention of this change was an attempt to ensure that the experts' assessment of the parolees' prospects, on release from custody, would be better reflected in the decisions taken. The change may remove the systematic flaw and eliminate an illusory correlation that Carroll *et al.* suggested as a possible cause of the parole interviewers' predictive errors.

In summary, the study of parole interviewers demonstrates that experts do make skilful and appropriate decisions when valid information is available to them. Carroll *et al.* analysed many of the assumed relationships on which the parole interviewers based their decisions and found that in instance where the relationship forms a valid correlation then decisions made based on this relationship were accurate.

2.4.12 Court judges

The study of court judges, by Ebbesen and Konečni (1975), considered the setting of bail in a simulation experiment and compared the outcome with observed results in the judges' natural domain. The simulation experiment required eighteen judges to independently consider eight fictitious case histories containing relevant material based on prior record, ties to the area, district attorney's recommendation, and the defence attorney's submission. A factorial analysis was used to evaluate the judges' response to the four types of information used to arrive at a bail recommendation. Results showed that the judges were apparently influenced by three of the four types of information: prior record, ties to the area, and the district attorney's recommendation. The fourth, the defence attorney's submission, had no significant effect on the bail set by the judges.

For the second part of the study five of the original eighteen judges were observed in a real bail-setting situation in court, and their recommendations were seen to be markedly different from those of the simulation experiment. The judges' bail setting in the court room, their natural domain of expertise, was apparently influenced solely by the recommendations of the attorneys, and in particular by the district attorney.

Although there are obvious differences in the judges' performance, in each of the settings, the judgements on bail setting were consistent. Therefore, reliability and validity are present in each case. The contentious point is the judges' performance in the laboratory setting. It is an example of why performance, measured as outcome, is not a valid indicator of the exactness of the process that produces it (Lipshitz, 1989), and emphasises the importance of evaluating experts within the domain in which they routinely apply their expertise. Ebbesen and Konečni acknowledged that stopping at the simulation experiment would have produced misleading information, which could have supported a false claim. Instead, their research indicates that court judges make reliable and valid judgements, although the judgements may be different in different settings.

In summary, Ebbesen and Konečni have convincingly demonstrated that an accurate study of expert performance is dependent on a proper understanding that experts interact with their environment; that is, the importance of the naturalistic study (Cohen, 1993). This is a clear demonstration of experts requiring environmental cues on which to base their judgement; in this case other court personnel. However, within each of the experimental situations, Ebbesen and Konečni found that the judges were consistent. The authors emphasise the importance of recognising that controlled laboratory experiments may not produce results equivalent to those gained in naturalistic settings.

2.4.13 Pathologists

Einhorn (1974), established what he considered to be “*necessary, if not sufficient conditions*” (p. 562) to define an expert for the purpose of his study of “*judges*” (p. 562) dealing with multidimensional information, in this case pathologists evaluating biopsy slides. Einhorn considered that experts’ judgement should be highly reliable; that is, each expert should produce similar results. Also the experts should demonstrate convergent, and discriminatory validity, implying that they should use similar analytical methods or constructs. Additionally, Einhorn expected experts to be consistent, in that they should use information in similar ways.

The pathologists were asked to evaluate 193 biopsy slides for the presence of nine important characteristics, each to be rated on a nine-point scale. They were then asked to provide a diagnostic evaluation of the overall severity of disease present, rated on a nine-point scale. Finally, the pathologists were asked to re-evaluate 26 slides, twice, to establish their ability to reproduce their judgement, otherwise known as test-retest reliability. The pathologists were not given any information other than the slides so that their analyses would not be influenced. The multidimensional aspect of the task was preserved so that contextual effects and interactions could “*play whatever role they normally did*” (p. 564).

Einhorn used extensive mathematical analysis to evaluate the data. He concluded that there was agreement between the pathologist’s analysis of the data and their

diagnosis, demonstrating reliability and consistency. He also found convergent and discriminatory validity, demonstrating the use of similar constructs. However, the pathologists apparently did not attach similar values to the various pieces of information presented. Einhorn suggests two reasons for this. First, there may be several alternative paths to a solution, and second there may be more than one way to perform the cognitive tasks leading to a solution. Consequently Einhorn decided that although agreement between experts may be desirable it might not be a necessary determinant of expertise. He commented that it is often the disagreement between experts and subsequent arguments that leads to the establishment of new knowledge.

There are two closely related features of expertise that Einhorn did not examine because his experiment structured the task, making consideration of them unnecessary. However, he apparently considered cues and creative problem structuring to be important. In his final discussion Einhorn states that experts may be able to make better use of cues than non-experts. He also suggested that experts may be more creative in thinking of solutions. Einhorn recognised that in a non-experimental setting problem structuring is important, and he thought that the two features would influence how the expert structured tasks. This influence was demonstrated in the preceding examples: ‘parole decisions’ Carroll *et al.* (1982), ‘court judges’ Ebbesen and Konečni (1975).

In summary, Einhorn’s study demonstrated that the experts studied were consistent and reliable in their decision-making processes. He also identified the importance of contextural cues and problem structuring. Additionally Einhorn suggested, in what appears to be the first acknowledgement of its possibility, that behavioural idiosyncrasies may influence the decision process.

2.4.14 The process/performance paradox

An examination of parole decisions (Carroll *et al.*, 1982), court judges (Ebbesen and Konečni, 1975), and pathologists (Einhorn, 1974) has shown that experts make well-processed decisions. Their decision processes follow logical associations; they are consistent, reliable, and appropriate. However, two of the

three instances also demonstrate that though the processing of information to form a decision is good, the end result, the decision performance or outcome, may not be correct. This is the process/performance paradox identified by Camerer and Johnson (1991).

It is apparent that some researchers evaluate experts' ability by assessing their decision processes, and others by evaluating their decision performance or outcome. Camerer and Johnson (1991) recognised a clear difference in perspective between these two major approaches to the investigation of decision-making by experts. They identified these approaches as behavioural research and cognitive research.

Behavioural research, according to Camerer and Johnson, is based on an evaluation of decision outcomes. This research indicates that experts performance is often no better than that of non-experts. Additionally, they claim that behaviourists believe that mathematical models often produce superior results. It must be mentioned that Camerer and Johnson's suggestion that the study of decision outcomes is a behavioural approach is contrary to the opinion of many researchers who claim to be following a behavioural approach (see for example Lipshitz, 1994, Klein *et al.*, 1993). Cognitive research focuses on the process followed by experts. Simon (1979) among others followed this path in artificial intelligence research.

I have already argued that expert decision-making processes are good. Carroll *et al.* (1982), Ebbesen and Konečni (1975), and Einhorn (1974), clearly demonstrated this. The contentious issue is why, if the processes are good, are the outcomes not always good? This question has been answered in part by the examination of the work on parole decisions and court judges. First, if the information on which the experts have to base their decisions is not correlated with the outcome then decision processing will not correct this flaw. Second, as the court judges demonstrated, experts are domain dependent. Therefore, it is to be expected that away from their domain of expertise contextual cues will be missing, and information will consequently be missed, or wrongly assessed.

Consistency in expert's decision-making was identified as a problem in some early research (Sarbin, 1944; Meehl, 1954) and the image has been perpetuated (Camerer and Johnson, 1991; Carroll and Johnson, 1990). Therefore, some consideration of the evidence is appropriate.

2.4.15 Methodological flaws

Some of the earliest reports claiming to be studies of experts were in fact not. Hughes' report of 1917 on grain judges, and the later report in 1962 by Trumbo, Adams, Milner, and Schipper, evaluated expert grain judge's performance for reliability and validity (Shanteau and Stewart, 1992). Both studies concluded that the experts' performance was inconsistent and no better than that of less experienced judges who graded wrongly approximately one third of the time.

The studies of grain judges are suspect for methodological reasons that were not evident to the authors at the time of their research. The people accepted as experts for the purpose of these studies would not now be acceptable. They qualified as experts by virtue of experience and/or peer identification with no apparent measure of skill, an essential component of any contemporary definition. Therefore, in this case it can be seen that the 'experts' were possibly no more expert than the less experienced judges.

2.4.16 Forecasting ability

The study of parole interviewers discussed earlier (Carroll *et al.*, 1982), highlights the difficulty of the task faced by experts in a very complex and inherently uncertain decision-making environment. Parole interviewers faced with a predictive decision may have to resort to guesswork like anyone else, and the results may not be good. This outcome is not unusual; people generally perform no better than chance when making judgement under uncertainty. The problem here is that experts may often refuse to accept that they are not capable of persistently good performance in uncertain conditions (Carroll and Johnson, 1990).

Experts' knowledge grows as they develop their expertise. This enables them to make excellent analytical decisions. They can see new patterns, assess variables, and test creative ideas (Shanteau, 1987). They carry out clearly superior information processing, usually making excellent choice within their domain of expertise, but their ability to predict or forecast future events is often no better than chance. However, some experts may not readily accept this negative outcome, because they are accustomed to success and have difficulty in accepting that their skills are not universally beneficial (Camerer and Johnson, 1991).

2.4.17 Mathematical tools

In the study of parole interviewers (Carroll *et al.*, 1982), the experts were asked to make an unaided assessment of the likely outcomes for future events; an intuitive assessment of possible future events. Assessing future events, known as forecasting, normally uses sophisticated mathematical tools to calculate probabilities. Mathematical tools should be superior to unaided judgement that is why they are developed. Consequently there should be no surprise when mathematical models produce better-forecast results than unaided experts basing their judgement on intuition. In fact there would be some concern if they did not. The comment by Carroll *et al.*, that the scientific prediction was no better than that of the parole interviewers, referred to the use of mathematical tools, and suggests that the parole interviewers performed well in very difficult circumstances.

Comparing the performance of an expert with that of a mathematical model is not a fair comparison. It is what Hammond *et al.* (1987) call indirect. By this they mean that a persons' intuitive effort is compared with systems that are person independent such as analytically derived rules, or equations that are held up as standards of rationality.

For research purposes the mathematical models are invariably provided with all the accurate, and only accurate, information required to calculate a result, and the calculation is always correct. In reality the selection of an appropriate model for

each type of forecast that an expert makes, and the acquisition of accurate data for the model, will be vulnerable to the same difficulties that face an expert.

If, when using mathematical models, researchers were faced with the same kind of problems that face an expert then perhaps mathematical forecasts would not perform as well as is claimed. An expert can face a combination of difficulties brought about by insufficient information, incorrect information and/ or inappropriate theory. These difficulties mixed with possible human errors in assigning numbers to formula or in making calculations, and the use of incorrect models exacerbated by lack of time (temporal constraints that are not imposed on a researcher's model), can mask the validity of an experts actions. When expert forecasts are wrong, often the decision was appropriate and the result within the bounds of an expected outcome, although the actual end result may be sub-optimal (Carroll and Johnson, 1990).

2.4.18 Experts may be better than mathematical models

By comparison, the incorrect outcomes from mathematical models can be totally erroneous and meaningless. Furthermore, there is evidence to suggest that expert decision-making is superior to mathematical models in non-routine, complex, and theory rich domains of expertise (Camerer and Johnson, 1991). Although the idea that experts should be capable of making consistently accurate decisions is appealing, there is little logical reason to expect it. Consistently accurate expert performance must be dependent upon complete knowledge of events within the domain of expertise. Anything else is guesswork. Furthermore, it is only in an ideal world that an expert is always going to have complete knowledge.

As an example, we can consider the position of a weather forecaster. These people are often well trained and educated with many years of specific experience, and due to sophisticated surveillance equipment, have information about the latest weather patterns. They can interpret the information available to them accurately to identify existing conditions, and they can often make good estimates or predictions about future weather patterns. Nonetheless, when complex weather patterns are presented, they may be unable to provide more than an indication of

the possible weather for the following day due to the uncertain and volatile activity of nature.

2.4.19 A comparison

A study of expert decision-making that compared an experts' unaided decision-making, that is without the use of analytical tools, with his/her decision-making with the access to analytical tools, would be interesting. This direct comparison of intuitive ability and analytical skill should better inform us about the relative effectiveness of both cognitive methodologies, as they will employed the same basic data (Hammond *et al.*, 1987). However, some people are not comfortable with mathematics; others delight in mathematical complexity and relish the challenge of mathematical modelling. As a consequence experts who are not mathematically inclined are unlikely to easily adopt mathematical methods and perhaps lack confidence in mathematical calculations thereby creating a reliance on their intuitive judgement. Conversely, experts who use mathematical methodologies as a part of their normal processing will readily have access to the best analytical data to compare with and possibly support their intuitive judgement. Therefore, the human variability may confound the kind of comparison proposed by Hammond and his colleagues.

2.4.20 A mismatch

Experts can be expected to fail when there is a mismatch between their cognitive abilities and environmental demands (Camerer and Johnson, 1991). Under mismatching circumstances experts are effectively required to work outside their domain of expertise, in effect as non-experts. The evaluation of decisions and decision-making by outcomes, rather than by the procedure that produced the outcome. is widespread but inappropriate (Lipshitz, 1989). Accuracy should not be seen as a measure of performance, but as a measure of potential performance. Actual performance by an expert can only be evaluated by taking all of the decision criteria and prior probabilities into account (Harvey, 1992).

Section summary.

More than knowledge and experience separates experts from non-experts. They use their expertise to make better decisions which when analysed exhibit different information processing methods from those of non-experts. Experts may take a ‘mechanistic’ approach to decision-making, and they rely heavily on intuition, cues, and heuristics to make well-calibrated decisions.

My conclusion, from the forgoing examination of the literature, is that bona fide experts do possess superior decision processing ability, although performance may not always support this. As Lipshitz (1994), Barron (1988) and others have recognised, there is a clear distinction between process and performance and the first does not necessarily produce the second. Within their domain of expertise experts do appear to be better decision makers than non-experts, at least in terms of their decision-making processes. Additionally, experts can produce more appropriate and therefore better results than mathematical models when they have access to similar information. However, factors external to the experts’ domain of expertise may cause performance failures.

2.5 How can ‘expert’ be defined?

The preceding three questions asked about experts to stimulate answers that clarified and examined the important characteristics that distinguish an expert. However, the answer to the first question, - What is meant by ‘expert’? - concluded that academic research requires a more rigorous definition than the literal one presented. Therefore this section considers the question – How can ‘expert’ be defined? – and examines some of the definitions that have been put forward by other researchers.

It is apparent that no single definition succinctly encapsulates the concept of an ‘expert’. In fact this may not be possible. There is a wide range of expertise, and it

may be necessary, as Einhorn (1974) has shown, to define the particular ‘experts’ being studied. But that does not excuse us from having a precise description to define experts in general, to ensure that experts are being studied.

There are effectively two camps studying experts: those that accept experts as better than normal performers, and those that do not. Shanteau and Ericsson are at the forefront of those that do, and Camerer and Johnson appear to lead those that do not.

Camerer and Johnson (1991) chose to define an expert as “*a person who is experienced at making predictions in a domain and has some professional or social credentials*” (p. 196). They draw no distinction between people who are qualified, and superior performers, unlike Ericsson and Smith (1991), and Ericsson and Charness (1994). Neither do they distinguish between experts by peer selection, as does Shanteau (1988), nor do they follow Shanteau (1995) by identifying the best.

The experts that Camerer and Johnson (1991) identify are the experts that a layperson may identify. They include doctors, academics, accountants, and scientists as people who, in the eyes of a layperson, are qualified to know the answers to questions beyond a layperson’s knowledge. This definition is extremely simple and convenient because it is easy to locate ‘experts’ using this type of definition.

However, the statements by Camerer and Johnson (1991), indicating that experts selected using their criteria do not perform better than non qualified people, must call into question the validity of their definition of ‘expert’. Are they examining bona fide ‘experts’, or simply qualified people without the prerequisite extensive skill, or knowledge, that defines an expert? The additional criteria, used by Shanteau (1988), of peer selection may ensure that the ‘expert’ is indeed an expert, not a novice with fresh qualifications and little experience.

Research credibility is dependent on precise definitions, whatever the subject material. This is particularly so with the study of experts, because the word

‘expert’ is in common use in colloquial English, and may create confusion and consternation; in the same way that the word ‘significant’ does - due to its statistical connotations. Even if we disregard common usage problems, we should still strive to be scientific in our methodology.

Internal validity that is within the subset ‘experts’ is an obvious scientific requirement, and it is not clear that it is being met. To use the old analogy, are we comparing ‘apples’ with ‘apples’? In many instances we are not. Furthermore, if we do not accurately, and clearly, define the characteristics that define the objects of our research, then we may inhibit the replication of our studies. Consequently this restrains the development, and testing of theory, as well as calling into question the relevance of our research.

Eysenck (1995) suggests that guidance, if and when we go wrong, is to be found in the scientific wisdom of criticism, replication and improvement. However, my criticism here is intended to suggest that improvement, in the form of a precise definition of experts, should come before replication. With a precise definition, consistently applied, internal validity may be achieved and replication becomes meaningful.

In the remainder of this section I examine some of the existing criteria for defining experts, then I discuss what may be required for the development of a comprehensive definition of ‘experts’.

2.5.1 Professional and tertiary qualifications

In any given field of expertise there are very few people who reach the top, and their moment of glory is often brief, as others overtake their achievements. Therefore, research that examines experts usually examines the less than perfect performance. Additionally, the mix of expert and novice will vary from one expert to another, and it will vary in the individual over time, as each expert gains more expertise. To ensure that a person is more ‘expert’ than ‘novice’, educational and professional institutions often established qualifying thresholds. Well-established disciplines will have a history of desirable performance and achievement to use as a benchmark, against which practitioners can be gauged. This may take the form

of tertiary qualifications or professional exams (Camerer and Johnson, 1991; Ericsson and Charness, 1994; Shanteau, 1988).

An inherent problem with defining experts by qualification is that the qualification standards are set by ‘experts’, and are a minimum standard (Shanteau, 1995). Some professional qualifications, such as accounting, law, and engineering, may require a period of professional practice, or experience, before awarding qualifications, though in many professions this is not the case. Very few tertiary qualifications have a practical content sufficient to do more than establish some familiarity with the application of the discipline involved.

As a consequence, landscape architects for example, spend several years, after qualifying, working on the basics to prove they are ‘expert’, before being permitted to work on projects that involve risk to people and the environment. Similarly, medical doctors have to undergo several years as a resident to develop and prove their expertise before they can work independently. Therefore, all newly qualified people cannot reasonably be expected to be a bona fide expert. Some will require a lengthy period of practice in their discipline to achieve that distinction. Therefore, I conclude that academic qualifications, in some instances be desirable, but they are clearly not sufficient.

2.5.2 Peer selection

It is widely accepted by researchers that peer selection is a valid tool for identifying experts for research purposes. Nonetheless, identifying an expert can pose problems. Shanteau (1988) chooses peer selection as a viable method for identifying experts, although he acknowledges that peer identification can lead to problems. However Shanteau states that he has not been able to find a better “*starting point*” (p206). Shanteau’s (1995) identification procedure centres on “*consensual acclamation*” (p17) and other forms of recognition such as job titles. Shanteau does not elaborate on what he means by ‘starting point’, but considering that he believes “*only the best at what they do deserve to be called experts*” (p.17), it may be reasonable to assume that he has had occasion to ‘fine tune’ his selection of experts, perhaps indicating that peer selection is not a perfect solution.

There are many degrees of expertise (Shanteau, 1995), and to be an expert in the eyes of ‘others’ may only imply that the ‘others’ are less capable, not that the ‘expert’ is the best at what they do. Expertise is often a matter of perception. A person with a higher skill level than the observer may be perceived as an expert. Therefore an expert becomes a person with higher skill, or knowledge, than the observer. Consequently the higher (or lower) skilled the observer is, the higher (or lower) skilled the expert is. This conundrum has created research problems, which have been identified as inappropriate selection (Ericsson and Charness, 1994), and justifies the establishment of a well-formed definition of what constitutes an expert.

Inappropriate selection is, surely, a flaw in the rationale used in many of the early studies of agricultural judges, and other ‘experts’, who consequently proved not to be better than novices at the task examined (Shanteau and Stewart, 1992). In these early studies people were designated to be experts by their peers, apparently in deference to their experience, or time served on the job, not their extensive skill or knowledge related to the function being assessed.

However, when Phelps and Shanteau (1978) evaluated the performance of livestock judges, the performance of the judges had been tested and proved to be better than that of other livestock judges. Phelps and Shanteau selected the judges from the Kansas State University senior livestock judging team, a position the judges held due to peer selection. The judges were, according to Phelps and Shanteau (1978), university trained, highly skilled, and had placed first in national judging competitions. Consequently the outcome of the study appears to demonstrate that peer selection can be successful if the population from which the ‘experts’ are selected has the prerequisite skills or knowledge base. However, although acknowledgement of experts by their peers is helpful, the possession of special skills or knowledge required for expertise is essential (Ericsson and Charness, 1994; Shanteau, 1995).

2.5.3 Superior performance

What is superior performance? Common sense suggests that we should expect experts to make better judgements than non-experts. If experts have access to superior knowledge, extensive experience, plus proven skill we should be able to expect them to consistently produce superior results. Unfortunately the issue is not as clear as common sense suggests. As mentioned in an earlier section, Carroll and Johnson (1990) discussed several instances of expert judgement and found that in many cases the experts were not consistently better performers than non-experts, and could in some instances be bettered by mathematical models. Camerer and Johnson (1991) produced similar evidence in support of their 'process/performance paradox'. This paradox asks why people can apparently be expert at processing information but non-expert when making decisions with the information.

Knowledge, extensive experience, and practice in a specified domain prepares an expert for decision processing within that field of expertise (Ericsson, 1997). However, their decision-making performance, that is the decision outcome, is dependent on the quality of the information available to them for processing as a decision. Additionally, the decision performance is subject to external influences beyond the decision-making expert's control. Therefore, it can be seen that consistent decision processing forms an essential part of expertise (Einhorn, 1974; Shanteau, 1995), but consistent performance (or decision outcome) does not (Camerer and Johnson, 1991; Carroll and Johnson, 1990).

To clarify this important point, consider how a person acquires expertise. It is generally accepted that expert ability is established over a development period of ten years or more (Ericsson, 1997; Shanteau, 1987; Simon and Chase, 1987), through deliberate practice of domain specific functions. There is no evidence that during this period any effort is applied to producing a superior, or even an improved end performance. All effort is applied to the acquisition of improved ability in the task process, not the end goal, which is often not defined. There appears to be a tacit assumption that deliberate and prolonged practice will lead to an improved performance, but no calculated procedure is followed in order to

secure success. Consequently, end performance is not part of the expert domain, and it is inappropriate to consider the performance of experts in this area as representative of their expertise (Harvey, 1992; Lipshitz, 1989). Nonetheless, outcomes do matter to an expert, that surely is why they strive to be expert, and outcomes are important to those who look to experts for results. The point here is that an expert ability does not guarantee outcomes, because there are many factors beyond the experts control, it does however ensure that the process that is followed is the best possible under the prevailing circumstances.

2.5.4 Establishing the existence of superior performance

Ericsson and Charness (1994), following the earlier definition by Ericsson and Smith (1991), defined an expert as a person capable of “*consistently superior performance on a specified set of representative tasks for the domain that can be administered to any subject*” (p. 731). They claim that this definition “*meets all the criteria of laboratory studies of performance and comes close to meeting those for evaluating performance in many domains of expertise*” (p. 731). The validity of this definition is questionable. For ‘any subject’ to be able to give a meaningful, or non-trivial response, they would need to possess the required knowledge and skills to perform the ‘set of representative tasks for the domain’. In other words it would exclude anybody who did not have the ‘expertise’ to perform the tasks. This definition would only compare ‘experts’ with ‘experts’, not differentiate between ‘experts’ and ‘non-experts’.

The definitions presented by Ericsson and Smith (1991), and Ericsson and Charness (1994) have some similarity to the statement by Shanteau (1995) – “*that only the best deserve to be called expert*” (p. 17). However, in requiring superior performance, Ericsson and Smith (1991), and Ericsson and Charness (1994) are not selecting the best, just those better than most. They identify superior performance as “*someone performing at least two standard deviations above the mean level in the population*” (p. 731). Statistical selection does ensure that those selected are better than the others within the population, but it does not guarantee that they are actually good at what they do. In trivial terms they could be ‘the best of a bad bunch’.

2.5.5 Uniqueness

To quantify experts, in the way suggested by Ericsson and Charness (1994) above, appears to restrict the research to tasks that can be compared with a statistically significant population with objectively derived criteria for assessing performance across the population. Global standards, frequently, do not exist for the real-world problems that experts contend with, and the only standards that are available are those set by experts as the threshold to their domain. Furthermore, bona fide experts often work in a domain of their own. They have developed their competence to a degree that it becomes different from others, not better than. Experts in a domain often differ dramatically from one another in how they perform tasks, even though their overall performance is of similar quality (Stewart *et al.*, 1992). Consequently there is no population to which they can be compared, other than the population of experts that they inhabit possibly as the sole inhabitant (Shanteau, 1988).

Leading academics in the field generally accept that an expert is a person who is highly trained in a particular field of expertise and has demonstrated an acceptable level of competence within that field to their peers; usually demonstrated by the achievement of academic or professional qualifications. Nonetheless specific studies may require particular conditions to be met. When introducing his study of Expert Judgement, Einhorn (1974) asked if the generally accepted definition is sufficient, or if more objective criteria should be defined. He set out what he considered to be “*some necessary, if not sufficient, conditions for defining expertise within a given situation*” (p. 562). The conditions that Einhorn refers to - identifying, weighting and combining, and agreement on environmental cues - are components of cognitive perception, and determinants of cognitive style. Einhorn only briefly touched on this aspect of expert judgement. He referred to the problem of extracting “*weak signals from background noise*” (p. 562), a phenomena that as been studied by many researchers attempting to gain an understanding of cognitive perception (Witkin *et al.*, 1971; Weisstein and Wong, 1988; Sutter *et al.*, 1989; Nothdurft, 1991), but apparently not by people studying expert judgement.

Numerous studies of experts have reported on this subset of the human population (Edwards, 1992; Ericsson, 1997; Ericsson and Charness, 1994; Ericsson and Lehmann, 1996; Hammond *et al.*, 1987; Shanteau, 1995; Shanteau and Stewart, 1992; Simon and Chase, 1973). Each report has carefully detailed the findings and attempted to explain them in terms of the definition of expert that has been adopted. Many studies take the definition of expert as a given, while others define experts as they, apparently, feel appropriate (Carroll *et al.*, 1982; Einhorn, 1974). The definitions are as diverse as the studies that use them (Shanteau, 1995), to the extent that there has to be some concern. Cited research, that has used a markedly different definition of experts, may not be valid support for the research being reported.

In attempting to determine what an expert is, there is a desire to demonstrate that an expert could be an entity with definable characteristics that will have generality across all domains of expertise (Ericsson and Smith, 1991). Given the huge diversity of activities that experts are engaged in, and the disparity of physiological and psychological requirements, an all-embracing theory is clearly desirable, but most unlikely for the same reasons that make it is desirable The variation in what constitutes expertise in different domains, such as pathology and weather forecasting for example is vast (J. Shanteau, personal communication, September 29, 2000).

A general theory of expertise would simplify the research eliminating much of the duplicated effort. It would also facilitate the dissemination of prescriptive theory. However, experts are a subset of a widely varied human population, which does not easily accept generalities. There are many subsets within the human population, and cultural studies indicate that the difference within groups is greater than the difference between groups (Weiner *et al.*, 1977).

Different cultures, different social groupings, different education, different access to resources, different geographic location, and many other factors combine in a multiplicity of ways to form experts (Ericsson, 1995). With such a variety of

formative factors, developing an all encompassing theory will be difficult, although realistically we can expect some aspects of expertise to be consistent.

To this point this section has examined some of the existing criteria for defining experts, now consideration is given to the requirements for establishing a comprehensive definition.

2.5.6 Two common goals should determine the definition of experts

From the literature several characteristics can be collected that separate expert accomplishment from that of non-experts. A selection of the identifying features may provide the defining statement that is sought. Following Einhorn's (1974) lead, experts could be simply people who skilfully apply their acquired training, and knowledge in a specialised field. Some scholars have accepted this definition as sufficient (see for example Carroll *et al.*, 1982; Carroll and Johnson, 1990), and it meets the requirement for clarity and conciseness necessary for a definition, but it lacks precision. There is no indication of how well trained, or knowledgeable a person must be, and the degree of skill is not established.

Skill, training, and knowledge are all, to some degree, measurable, and should be measured to establish minimum criteria for expert status. These three criteria are the fundamental constituents of developed ability and are easily identified. Professional and tertiary qualifications exist and may be used to establish a knowledge and training thresholds in domains of expertise that have these benchmarks. In domains that do not have established benchmarks other criteria of a similar standard will be necessary. The skill factor appears to be developed through lengthy and persistent practice (Ericsson, 1997), and a minimum period of ten years seems to be appropriate (Simon and Chase, 1973; Shanteau, 1995). Measurement of these factors will not be exact. There is always a margin of error in any measurement, but consistent measurement can be built upon, and permits meaningful comparisons to be made (Eysenck, 1995).

It is necessary to decide why experts are being studied and what is expected to be learnt from these studies before defining experts. To do this there must be a theory in place before seeking facts (Eysenck, 1995). That theory will establish goals, which will in turn determine how experts should be defined. Clearly scholars should establish their own theory to motivate their research, but it is reasonable to suggest that one goal for all studies of experts is to attempt to understand how experts accomplish what they do. It also seems reasonable to suggest that another goal is be able to compare research related to experts with other studies of the topic.

Researchers have two goals in common: to understand the accomplishments of experts, and to be able to compare the results of our labour. The accomplishment of the first goal is greatly aided by satisfaction of the second. In fact, now that there is a large body of literature on experts, the second goal is, in most instances, more valuable to the advancement of knowledge about experts, than the first. Therefore the goal that should determine the definition of experts is the need to be able to compare new work with that of other existing work. Consequently parameters are needed that define experts with some precision. The necessary definition should establish a clear and concise description of an expert so that one can be easily identified. When identified he/she will possess at least the necessary qualities to meet the established criteria of expert, possibly more, never less (Ericsson, 1997).

If the term 'experts' is accepted as a classification of a subset of the human population with particular abilities, then the subset's position along a continuum representing ability can be established by establishing boundaries between the subset and other members of the population who possess abilities that differ from those of an expert. Once a model is established consideration can be given to what should be included in, or excluded from, the classification. This requires some consideration of what constitutes ability, how it is attained, how it is identified, and how it is measured. The definition needs to be concerned with developed abilities, not natural ability which is a subject for other studies, such as giftedness and genius (Galton, 1869/1972; Ericsson and Charness, 1994; Eysenck, 1995). This does not exclude people who have special abilities from our definition. It

merely excludes the requirement of special abilities as a necessary factor for classification of a person as an expert.

2.5.7 A minimum standard may be sufficient

For the study of experts, a minimum standard is arguably the only important one since it eliminates non-experts. An upper limit would differentiate between experts, perhaps separating ‘expert’ experts, from lesser experts. This may be desirable for some studies. When comparing the ability of a chess grandmaster, for example, with less able, but still expert, masters of chess (Simon, 1979). However, an upper limit does not appear to be essential for defining experts. Additional defining criteria to isolate a particular type of expert could be added when necessary (Einhorn, 1974), but that then limits comparison with other research and may therefore better avoided where possible.

It has been identified that no single definition is sufficient in its self, but several of them identify criteria that are necessary for the definition of experts. Experts must have excellent knowledge and extensive experience within a specialised field, plus the skill to apply their knowledge and experience appropriately. These are essential ingredients of expertise, although possession of these attributes alone is not sufficient to define an expert. This can see this by considering Einhorn’s (1974) study of three pathologists.

Einhorn identified several ‘conditions’ that were necessary for his study, a specific evaluation of pathologists’ ability to evaluate information, but did not state what would, in his opinion, be sufficient to be sure that he was, in fact, studying experts. His three subjects were pathologists, a specialisation requiring extensive training and detailed knowledge of disease. However, one of Einhorn’s ‘experts’ was a resident, a term used to describe a person training as a specialist after completing a period as an intern, and was, as Einhorn states, “*learning his task to some extent*” (p. 570). Nonetheless, the resident would have been highly educated and trained and experienced in the field, although of questionable expert status, particularly in view of the difference between his performance and that of the other pathologists. In all probability the resident became as accomplished as

the other pathologists, but at the time of Einhorn's study he clearly was not an expert.

There has to be a point at which a person moves from being a highly qualified novice to an expert. Clearly this transition will not be a moment in time. Individuals will require more or less development depending on many factors, such as aptitude, dedication, opportunity, etc. so the actual change from novice to expert will take place at varying stages of development.

Nonetheless, to separate experts from non-experts we must have a gauge that we can measure experts against. This has been provided by the results of extensive research showing that people take a minimum of ten years to develop a mastery of their specialisation. Furthermore, it is now understood that without persistent and specific practice over an extended period of more than ten years, experience will not necessarily lead to superior ability (Ericsson and Lehmann, 1996; Shanteau, 1987). Simon and Chase (1973), and Ericsson (1997) mention the need for an extensive period of persistent practice to develop 'expert' ability, but surprisingly none use this characteristic as a defining issue. However, it appears to be a key component in the definition of 'expert'. This development period proves the inadequacy of some of the definitions mentioned earlier. In particular it shows that for research purposes at least defining experts by professional and tertiary qualifications, or using a literal definition is not sufficiently precise.

From the above we can accept that an expert is a person with at least ten years development in a specialised field. This must be included as another necessary factor, but it is not in itself sufficient. There are many people who have worked for ten or more years in a specialised field who have not developed expertise to the level of 'expert' (Ericsson, 1997; Ericsson and Lehmann, 1996; Shanteau, 1987).

It may not be possible to define experts objectively. Excellent knowledge, extensive experience, skilful application of knowledge and experience, and a development period in excess of ten years are all strong defining attributes in themselves, but they do not completely define an 'expert'. As Ericsson (1997) has

stated, there are many people who have aspired to expert status, and have worked diligently to develop the necessary attributes, but for some reason they have not made the grade.

Many criteria are said to be defining characteristics of experts but no combination of them appears to completely represent the phenomenon. In the final instance the definition appears to be subjective. If a person has knowledge, experience, and skilled application, which have taken ten years or more to develop, is he/she an expert? The only arbiter is performance, which, due to its nature, cannot be objectively measured. If it could be measured then we would not have a need for a definition, because the satisfaction of the measurement would suffice. The only available gauge of an experts' performance with reasonable validity, is evaluation by associates. Shanteau (1995) has frequently used peer identification to locate experts for his research. [Note: I use the term 'associates' to describe people who are involved in the field of expertise, but who are not the equal of the expert, as the term 'peers' implies].

In summary the essentials for a definition of 'expert' appear to be based mainly on prior ability (inputs), not achievements (outcomes), as the list that follows indicates:

- Possession of specialised knowledge.
- Possession of specialised experience.
- An ability to skilfully apply both.
- Acquisition of expertise through appropriate and persistent practice.
- Achievement of expert status requires a minimum of ten years specialisation.
- Recognised by associates as better than most.

2.5.8 Experts who do not meet the criteria

As a cautionary note it should be realised that new fields of endeavour and perhaps rapidly changing fields may permit a person to demonstrate some of the requirements of expert ability without having a mastery of the field. For example, a person may be at the leading edge of skill, or knowledge acquisition within a new discipline, such as computers, and satisfy many of the necessary criteria for

expert status, such as recognition by their associates. Nonetheless, although they are able to perform at a superior level to their associates, they are not yet sufficiently conversant with governing principles that mediate outcomes within the new field. Furthermore, they are unlikely to become ‘expert’ due to the rapidly changing nature of the discipline. Therefore their ability, though superior to less experienced practitioners, will lack the consistent excellence that is characteristic of the true expert, and they should not be considered as ‘expert’ (Einhorn, 1974; Ericsson and Charness, 1994).

2.6 Chapter summary

In this chapter I examined the literature that relates to experts. I began by considering why experts are important. I discussed a perceived societal dependence on experts, and the possibility that an understanding of experts may be greatly beneficial for the general population. In this first section I also discussed the potential of experts as managers. In many domains of expertise, experts appear to combine managerial skills with their more specific task abilities, and there are indications that those managerial skills may be transferable to a managerial role.

After the preliminary discussion, I asked the obvious question, what is an expert? I attempted to provide an answer through four questions that appeared to be important when considering the main question.

The subordinate questions are presented below, each with a brief synopsis of the material presented in answer to the question.

First question - What is meant by ‘expert’?

Answer: In general terms the designation expert denotes a person who has special and/or extensive skill or knowledge in a particular field. However a more rigorous definition may be required for academic research.

Second question - What makes an expert?

Answer: A combination of natural ability, motivation, training, and plenty of hard work apparently make an expert.

Third question - What separates experts from non-experts?

Answer: More than knowledge and experience separates experts from non-experts. They use their expertise to make better decisions which when analysed exhibit different information processing methods from those of non-experts.

Fourth question - How should an 'expert' be defined?

Answer: A rigorous definition requires that an expert has achieved specialised knowledge and experience, and an ability to skilfully apply both through appropriate and persistent practice over a minimum of at least ten years specialisation, and is recognised by his/her associates as better than most in the designated vocation.

An evaluation of the answers to the four questions above provides a complex answer to the main question, what is an expert? The answer is summarised as follows:

- (1) Expert status evolves over time. It may require ten or more years for a person to develop sufficient expertise to be recognised as a bona fide expert (Ericsson, 1997). This period of ten or more years to become an 'expert' is indicated by extensive research and appears to be an important benchmark in 'expert' research.
- (2) Expert ability is constrained by the domain of expertise (Ebbesen and Konečni, 1975, Stanovich, 1999). Through extensive training and experience experts develop specific abilities, which are often domain specific. This implies that away from their domain of expertise they are non-expert. It may be that their skills are appropriate in a different environment, but referring to (4) and (5), the expert may not be able to locate the critical information cues.

- (3) Experts are different from non-experts. As their expertise develops and they acquire better decision-making processes (Baron, 1988), they become mechanistic in their approach to decision-making. Experts acquire the ability to identify the appropriate path to a solution, and process available information in a non-goal specific manner while working towards the goal.
- (4) Experts are able to perceive information that is either incomprehensible or simply not visible to non-experts (Shanteau, 1992b). Experts have an acute understanding of their domain of expertise. This enables them to identify and understand information cues that would possibly be missed by a person who is not familiar with the domain.
- (5) Experts can recognise and interpret complex patterns of information and critically discriminate between relevant and redundant information (Shanteau, 1987). This builds on (4), because an expert is acutely aware of events within their domain of expertise they can see relationships between cues.
- (6) Experts are able to manage and manipulate the decision process to accommodate their particular expertise (Klein, 1998). This builds on (3), because experts have a mechanistic approach to decision-making, they can select their preferred procedures.
- (7) Experts rely on intuitive judgement to guide them towards and often provide a solution to a problem (Hammond *et al.*, 1978). This builds on (4) and (5). Experts are acutely aware of events that take place within their domain of expertise, consequently they can form intuitive conclusions about probable outcomes, and therefore possible solutions.
- (8) Experts are able to assess the accuracy of the decisions that they make as they make them (Kleindorfer *et al.*, 1993). This is related to (7). Experts, because of their familiarity with their domain of expertise, can use intuitive judgement to assess the accuracy of formally derived solutions.

From this list of characteristics that distinguish an expert it is seen that all but the first two can be described as cognitive functions. The first (1) is a measure of the time required by the cognitive processes to develop all the other abilities listed and the second (2) determines the limits of an expert's superior cognitive development.

It comes as no surprise to find that experts are dependent on a highly developed cognitive system, because even the most rudimentary observations lead to a conclusion that experts possess more knowledge than non-experts. A more thorough examination of the cognitive behaviour associated with expertise is presented in Chapter 4 [section 4.1]. However, although expertise appears to be firmly based on appropriate cognitive behaviour there is apparently no indication that expertise requires above average cognitive ability (intellect), only that the abilities associated with expertise appear to be possible due to highly trained cognitive functions (Eysenck, 1995).

This chapter has examined descriptive theory concerned with experts to provide a foundation for the next chapters (Chapters 3 and 4) to examine topics that are interwoven with knowledge about experts. Chapter 3 examines pertinent decision-making literature to determine how to evaluate the decision-making processes of experts. Chapter 4 examines behavioural factors to consider the mediating influences (cognitive) that impinge on the expert.

CHAPTER 3



Decision-making

A review of some critical aspects of decision-making theory

Experts, as explained in the previous chapter, are particularly good decision makers within their domain of expertise. This chapter examines aspects of decision-making theory that may be present in experts decision-making processes. Consideration is given to the kind of decision-making that individuals can, reasonably, be expected to meet in a managerial context. In the previous chapter it was established that expertise is a cognitive ability, therefore the focus of this chapter is on aspects of decision-making theory that may be susceptible to cognitive variables. These cognitive variables are examined under the umbrella of psychological factors in the next chapter.

The chapter begins with brief reviews of (1) the origins of decision research, (2) the meaning of decision-making, and (3) decision-making situations. Next, (4) decision-making theory is examined with an emphasis on aspects that may influence expert decision-making. The chapter concludes (5) with an examination of factors that determine how decisions are made, with an emphasis on decision-making in a managerial context.

3.1 The origins of decision research

It is clear that decision-making has been a subject of academic research for many years. There is documented evidence that Aristotle and Euclid discussed decision-making (Suppes, 1984). More recent discussions in the 18th century by philosophers, mathematicians, and economists, such as Kant, Bayes, Laplace, and Smith, laid the foundations for the study of decision-making. At the beginning of this century philosophers, economists, and probabilistic mathematicians continued to dominate decision-making research. However, later in the century other disciplines, notably management (previously engineering) and psychology, began to study decision-making. (for a more detailed coverage of this material see Bernstein, 1996).

3.2 The meaning of decision-making?

Decision-making has in the past been differentiated from problem solving by the fact that alternatives were considered to be known to the decision maker, but needed to be discovered by the problem solver (Simon, 1966). However, it is now accepted that this model does not reflect the circumstances faced by decision makers in a business environment, who must often make decisions with uncertain alternatives (Simon, 1993). Therefore problem solving is now studied under the rubric of decision-making.

Decision-making has different definitions amongst authors. March (1994) states that *“by far the most common portrayal of decision-making is one that interprets action as rational choice”* (p. 1), but decision-making is defined as *“a commitment to action”* (p. 261) by Langley *et al.* (1995), and Lipshitz (1994) considers decision-making to be *“a process of reasoning”* (p. 62). Raiffa (1994) defined decision-making as *“...a choice involving uncertainty of outcomes, possibly including uncertainties arising from the deliberate, but not completely predictable, actions of other”* (p. 4).

In simple terms decision-making can be seen as a process of finding a path between the initial state (problem recognition) and the desired state (problem solved).

3.3 Decision-making situations

Decisions can be made under conditions of certainty, uncertainty, risk, or conflict (Schoemaker and Russo, 1994). Under certainty, decisions have predetermined or known outcomes, and are judgmental decisions; for example is A better than B? Decisions under uncertainty are in effect a gamble without knowledge of outcome probability, as for example when buying a present for a parent, or opening a new business without a market survey. Decisions under risk are a gamble with known probability, as occurs when betting on horse racing, or when opening a business based on a market survey. Decision under conflict takes place in an environment where the competition may attempt to counter the decision, as in chess and many competitive business situations.

3.4 Decision-making theory

There are essentially two separate schools of thought on decision-making, which, to a large extent, are mutually exclusive; the normative school and the descriptive school (Tversky and Kahneman, 1990). However, both schools are concerned primarily with procedural rather than substantive rationality (Simon, 1979b). This suggests that there should be a close relationship between normative and descriptive decision theories provided that decision makers act rationally within the constraints of their cognitive abilities and the constraints of their decision-making environment. This ability to act rationally within personal and

environmental constraints is known as bounded rationality, and is discussed in more detail later.

Both the normative and descriptive areas of enquiry have developed prescriptive theories (Kleindorfer *et al.*, 1993; Raiffa, 1994), and there is now a new naturalistic approach, which is primarily descriptive, attempting to establish new theories (Doherty, 1993). I now examine each of the theoretical approaches in turn, starting with normative theory.

3.4.1 Normative theory

Classical decision theory is founded on the concept of a rational actor adhering to a set of axioms. This is normative theory. It is dominated by subjectively expected utility theory (SEU) and multiattribute utility theory (MAUT). SEU and MAUT can function as normative, descriptive, or prescriptive models, but in any of these forms they are not accepted as good normative models of human behaviour (Doherty, 1993).

Many economists and mathematicians persistently (and intentionally) ignore deficiencies in their assumptions about the environment in which they are to be applied, concentrating on the ideal, or normative, model. The normative school continues with the ideas put forward by the economists Keynes and Pareto, that is with subjective expected utility, optimising, and probability, to achieve the goal of the rational decision maker (Simon, 1992). This is classical economic theory, and it requires the decision maker to follow a highly rational procedure for making decisions. It assumes that decision makers have consistent preferences, know their preferences, and know the alternatives available to them. It also assumes that the decision maker has access to information about the consequences of selecting each alternative, and will combine the information according to the expected utility rule, which weights outcomes by their probability of occurrence (Carroll and Johnson, 1990).

In normative terms it is important to be able to distinguish rational from irrational decision-making. Rational decision-making, otherwise known as rational choice

or rational judgement is, a distinctive behaviour that seems to be appropriate for the achievement of specified goals, within the limits imposed by existing conditions and constraints (Simon, 1976). Irrational decision-making implies decision-making that does not, for any reason, follow the desired process as defined by normative principles (Bell, Raiffa and Tversky, 1988).

3.4.1.1 Rationality

It is important to my study, to consider the difference in the meaning of the term 'rational' in the context of decision-making from the perspectives of an economist and a psychologist. The following definitions derive from Simon (1976).

- To economists 'rational' is axiomatically defined as maximising over some time interval, the anticipated value of a utility function. In other words it is an action or choice.
- To psychologists 'rational' indicates an intellectual process that leads to a choice'.

The distinction between the two is critical for the assessment of decision-making from a behavioural perspective, which I write more about later, and explains why the study of decision-making by psychologists comes under the rubric of cognitive processes (see Chapter 4).

Rationality is to many authors synonymous with normative theory, and often used interchangeably (Eisenhardt & Zbaracki, 1992). This does not reflect the true picture. All normative decisions are by definition rational, but the reverse is not necessarily true. Rationality is, by the above definitions, an intention to follow an established procedure. This in no way restricts the decision maker from proceeding in a rational manner outside the bounds of normative theory. Information available is not always accurate or based on correct assumptions, and additionally the contingent decisions of others can have unexpected and possibly unavoidable consequences. This may cause an erroneous and apparently irrational decision, but it will in fact have been reached by following the correct, rational procedures. In short, the decision maker is not assumed to be a clairvoyant.

3.4.1.2 Bounded rationality

Early attempts to create artificial intelligence followed the normative model. In an effort to imitate experts, computers were programmed to make decisions using normative methods. However, a conclusion was reached that the human brain is unable to compute calculations in the manner envisioned due to the brain's limited processing capacity. This conclusion led Simon (1957) to propose the widely accepted concept of bounded rationality.

As mentioned earlier many decision theories anticipate that decision makers will usually follow rational patterns of action that can be predicted, given an understanding of the decision rules and the options available. However, Simon (1945/1957) cautioned that it is impossible for a single, isolated individual to behave that a high degree of rationality may be reached. There are so many alternatives to be examined, and the information available so vast that it is difficult to believe that the decision maker can come close to objective rationality. Individual choice, as Simon states, takes place in an environment of 'givens', such that assumptions are accepted by the subject as bases for his/her choice, and the decision makers behaviour will adapt only within the limits set by these 'givens'. More recently Simon concluded that any theories that attempt to include constraints on the information processing ability of the decision maker should be called 'theories of bounded rationality' (Newell and Simon, 1972).

Simon is confirming that decision-making can be very complex and intellectually demanding. As Lopes (1992) states in her comments about Simon's work on bounded rationality, "*Simon does not suggest that people are dumb, his argument is that problems are hard*" (p. 253). Decision-making requires an ability to create reasonable approximation procedures and heuristics that will allow immense spaces to be searched very selectively. This ability to mentally examine and interpret the environment is the basis for the development of intellect, and is mediated by perceptual ability. It forms the core of intelligence (Simon, 1978), and Stanovich (1999) presents evaluation of the role of intelligence in rational decision-making.

3.4.1.3 Incremental decision-making

Bounded rationality is still a rational action, based on decision-making as a sequential process. There are decision-making models that are thought to be 'less rational', such as Lindlom's (1959), incremental model. In this model decision makers are said to search for alternatives that are only slightly different from the existing situation. This happens repeatedly, with the decision maker making frequent small changes. Nonetheless, it is usually assumed that these incremental changes are arrived at through a rational process.

3.4.1.4 A prescriptive role

Classical decision theory not only takes on a normative function it also takes a prescriptive role to explain how the rational actor, otherwise known as Economic Man, would follow a rational and uniquely appropriate path to a decision (Beach and Lipshitz, 1993). The prescriptive role implies that if decision makers behaved, as they should then classical theory would also be descriptive of peoples decision-making behaviour.

3.4.1.5 Section Summary

In summary, normative theories may be the best procedures to follow optimum outcomes when making decisions, but they have limited value for the individual decision maker. This is because normative theories do not allow for the environment in which the decision maker is required to make decisions. Normative theory prescribes mathematically sound methods by which the decision maker may be able to achieve an objective. However, the under lying theory that supports normative models is based on human judgement, therefore it is difficult to say whether the optimal model or the human representation captures the essence of the decision more adequately (Einhorn and Hogarth, 1981). Nonetheless, the fundamental value of normative theories is that they provide the optimum solution, often an unreasonable goal for mere mortals, but a worthy goal to aspire to (Baron, 1988).

A crucial flaw in rational decision theory, from the behavioural perspective, is that assumptions about rational action do not consider real decision makers (Beach

and Lipshitz, 1995; Simon, 1979). First the decision-making rules and the options available for decision-making may have little similarity to circumstances faced by decision makers, and second due to circumstances best known to the decision maker, they may not behave in the anticipated rational manner [although not necessarily behaving irrationally]. Therefore, normative theory cannot adequately describe observable human decision-making (Beach and Lipshitz, 1993). Additionally, mathematical and economic models of decisions frequently do not compare favourably with the conditions faced by decision makers in a business environment (Orasanu and Connolly, 1995), and the models fail to recognise the limited ability of the decision maker to cope with all the options that are presented.

As a final comment on normative theories, it appears that because they are dependent on the 'rational actor' they have no place for the creative person who may find alternate processes to reach a valid conclusion. My concern lies with Einhorn's (1974) comment that there are many instances where "*oddballs did not agree with anyone, yet were proved to be correct by subsequent events*". This is particularly relevant in a study of decision-making by experts. Experts are known to be creative problem solvers (Hammond *et al.*, 1987; Shanteau, 1987). Irrational decision-making as defined by Bell, Raiffa and Tversky, (1988) considers the general case not the creative exceptions that may be capable of finding a better process to reach a decision (Einhorn, 1974). Stanovich (1999) considers individual differences in decision making and provides a further perspective on the rational versus irrational issue.

3.4.2 Descriptive theory

Many researchers now pursue decision-making from a perspective that asks how people make decisions, rather than how should decisions be made (Payne, 1982). Tversky and Kahneman (1986), Mintzberg (1976), and Simon (1955) have expressed concern that decision makers are often unaware of psychological effects associated with decision-making, or of how to resolve them when they are aware. This has caused researchers to develop a behavioural perspective of decision-making, which describes what decision makers do. Tversky and Kahneman (1986)

justified this in their statement that, “*The logic of choice does not provide an adequate foundation for a descriptive theory of decision-making*” (pS252). The conclusion is that normative theory, or more specifically the essential axioms of the rational choice paradigm, cancellation, transitivity, dominance, and invariance, is not an appropriate axiom for descriptive theory. The reason being that problem framing effects can cause decision makers to violate any of the axioms. [Note: Framing refers to a process that allows information to be placed in context with existing knowledge, and is discussed in greater detail later in the chapter].

Descriptive theory, unlike normative theory, considers the behaviour of the decision maker. Consequently, descriptive theories are enriched with aspects of human behaviour, such as framing. This complicates the descriptive analysis of decision-making and also separates descriptive theory from normative theory. Unlike the normative decision theories discussed earlier, which provide models that can be seen as ideal ‘methods’, descriptive theories examine the decision-making processes in which the normative methods are supposed to be utilised (Raiffa, 1994). The descriptive school apparently accepts the principles of the normative school, but has moved away from purely theoretical notions to include an acceptance of the constraints that are imposed on theoretical models by the ‘real world’. That is, a world in which decision makers make errors, are imperfect analysts, and have varying cognitive perceptions and ability.

In simple terms descriptive decision-making theories describe how decisions are actually made in real decision-making situations. Theorists are working on an assumption that by understanding what decision makers are trying to do, they as theorists will be better equipped to help improve the quality of decision-making (Beach and Lipshitz, 1993). Consequently, any descriptive model of decision-making must be based on observable decision-making patterns (Cook and Levi, 1990). This behavioural perspective attempts to develop an appreciation of the environmental constraints that are imposed on decision-making and decision makers (Marris and Egidi, 1992). From this expanded perspective of decision-making theorists consider work to understand how decision makers frame problems, and how decision makers work through the decision-making process, so that prescriptive solutions may be developed.

It is apparent that descriptive theory considers decision-making events to enable prescriptive solutions to be proposed based on normative principles. However, Raiffa (1994) suggests that prescription could form a third classification of decision-making theory, “*which deals with giving real people, as opposed to super rational people, some thoughtful guidance about how they might wish to act in a wiser fashion in real situations*” (p. 4). In the past many people have considered prescription to be the purpose of normative decision-making (Baron, 1988). However, it is now commonly accepted that prescription in decision-making takes the form of models designed to help bring the results of actual decisions closer to the normative model, which is assumed to be the ideal.

[It should be noted that the behavioural perspective referred to here is not a strict following of the psychological doctrine of behaviourism as developed in operant theory by Skinner (1966). The behaviourism of decision-making acknowledges a cognitive component, which is separate from, and additional to, the relationship between “*a stimulus, a response, and a reinforcing consequence*” (p. 226) that Skinner recognised.]

3.4.2.1 Irrational decision-making

In decision-making research, rationality is a required part of the decision-making process, whether it is studied normatively or descriptively (Eisenhardt and Zbaracki, 1992). Irrational decision-making has no place in the study of decision-making, at this time. However, the garbage can model, a descriptive model proposed by Cohen *et al.* (1972), comes close. It pictures organisational decision-making as the random coming together of occasions looking for a decision, answers looking for problems, peoples’ concerns, and busy people. The garbage can model supplements rationality with timing and luck, and decisions become an erratic and random confluence of events. However, the garbage can model may be seen as a clever reminder of the importance of chance, although it is apparently not empirically robust (Eisenhardt and Zbaracki, 1992).

The garbage model is put forward as a descriptive representation of organisational decision-making. It is presumed that individuals within the organisation will attempt to continue applying rational processes to their decision-making, without

consciously allowing the factors identified by Cohen *et al.* (1972) to influence their deliberations. If decision makers were not rational the researcher would be faced with a random selection of incoherent activity. In reality, rational decision makers may have to contend with the difficulties identified by Cohen *et al.* as well as political systems in which the decision maker has partially conflicting objectives and limited cognitive capacity (Eisenhardt and Zbaracki, 1992). The idea of bounded rationality, as mentioned in earlier [section 3.4.1.3] is an attempt to explain the possible outcome from conflicting objectives and limited cognitive capacity. Consideration of the influence of politics on decision-making takes place later in the chapter [3.5.5.7/8].

3.4.3 Naturalistic decision-making

The study of naturalistic decision-making is a recent occurrence. Naturalistic decision-making dismisses established decision-making theories as inappropriate approximations to ‘real’ decision-making (Doherty, 1993). Everyday situations faced by decision makers do not contain discrete decisions; decisions are interwoven and frequently interdependent in a similar way to nested computer programmes (Orasanu and Connolly, 1993). This is reality, and it is what naturalistic decision-making attempts to study. However, it is clear that normative theory does not readily transfer to the ‘real’ world; many people have acknowledged this (Simon, 1979b). Therefore, criticism of classical decision theory by supporters of naturalistic decision-making does not break new ground (Doherty, 1993). Additionally, it is not clear how naturalistic decision-making differs from descriptive theory. Nonetheless, the study of decision-making under the naturalistic banner has produced some interesting literature. Following Raiffa’s thoughts mentioned earlier, naturalistic decision-making attempts to give ‘real people’ the guidance that they need.

Important for my research, is the methodology employed to study naturalistic decision-making. The two major methods are case study and self-report in an interview setting (Klein *et al.*, 1993). These are the procedures used in my research, and they are examined in detail in the methods chapter.

3.5 How decisions are made

In this section I examine how decisions are made with particular emphasis on intuition, heuristics, problem identification, problem framing, and politics in a decision-making context.

Decision-making in a business environment can, according to Schoemaker and Russo (1994) be conveniently divided into four categories for the purpose of analysis; although in practice the divisions may not be distinct. Schoemaker and Russo refer to this as “*a pyramid of decision approaches*” (p. 71). The four distinct categories are intended to reflect the frequency of use, plus the accuracy, complexity, and cost of the methods.

The first category identified by Schoemaker and Russo is decision-making based on intuitive judgement. This is the easiest and the least costly, but the least consistently accurate and the most frequently used. Intuitive judgement occurs when a decision maker relies on an instinctive belief or ‘hunch’ to formulate a decision.

The second category is decisions based on heuristics. It is said to be more efficient than intuitive judgement because it is more consistently accurate, but this method can be slower. The heuristics used by decision makers may be personal guidelines established through experience, or ‘rules of thumb’ that have been established by others in the field.

The third category is decision-making that uses weighting to establish value or probability. Decision makers frequently attach values or probabilities, known as weights, to components of the decision and these influence the decision-making process. When done properly the calculations can be time consuming, but the eventual outcome may be more in line with the desired outcome. It is considerably more time consuming than the first and second options, and therefore more costly, but because the weights form an analytical structure it is more in line with normative theories.

The fourth category is value analysis. This is the most expensive and, with the usual caveats, the most accurate. It is mostly used by large organisations for major projects. This process is similar to the third method, but it is a more complex cost benefit analysis of all possible scenarios leading to an outcome.

From the four categories the first and second, intuitive judgement and heuristics, are most applicable to the study of expertise. The third, weighting, is probably used by experts both formally and informally. Weighting may be used to make structured decisions that follow established procedures, and it is likely to have become part of the expert's intuitive judgement and heuristics. The fourth, value analysis, is too complex to be used in everyday decision-making by an individual and is more appropriately considered as an organisational method. Although it could involve the expert, or even be expert driven, value analysis should be considered as a tool to be used rather than as a characteristic of the expert using it.

Intuitive judgement (category one above) is a personal characteristic that is common to most people. In the previous chapter intuition was identified as an important defining characteristic of expertise (Shanteau, 1987). Experts' intuition combines with the use of heuristics and weighting (categories two and three above) to enable superior decision-making to take place (Hammond *et al.*, 1987). Intuition is examined in more detail in the next section.

Heuristics are particularly relevant to a study of experts. Throughout the process of developing expertise the expert will be exposed to existing heuristics, and will probably develop heuristics of their own (for a comprehensive consideration of this perspective see Gigerenzer and Todd, 1999). Intuition and personal heuristics are what Simon refers to as analytical skills that have become absorbed by the expert to the extent that they are automatic and can be used without conscious effort (Simon, 1987). Although not everybody agrees with Simon's explanation (see Mintzberg, 1989), intuition and heuristics are accepted as important characteristics of individual decision-making, and particularly that of experts. Heuristics are examined in more detail after the next section.

3.5.1 Intuitive decision-making

There is general acceptance that many decisions are intuitive; that is to say the decision makers rely on their own judgement without reference to established decision-making processes (Targett, 1996). Intuitive derived decisions can sometimes be brilliant, particularly when based on expertise and extensive past experience. It can be argued that intuitive, heuristic, and weighting processes are often combined to form expert intuitive judgement (Hammond *et al.*, 1987). An expert, a person well trained and experienced in a particular field, does not choose between intuitive or analytical methods. He/she can be expected to be conversant with a range of decision-making skills, and to apply them appropriately. Furthermore expert intuitive judgement can be superior to formal analysis by the same person (Hammond *et al.*, 1987; Simon, 1987).

A difficulty that is faced when studying intuitive decisions is that the decision maker is typically unable to explain his/her actions, or the procedures that he/she followed to reach his/her conclusions. Researchers have observed decision makers' ability to rank criteria in order of importance, and have commented that the decision maker is typically unable to explain the reason for his/her ranking (Korhonen and Wallenius, 1996). Schoemaker and Russo (1994) provided an example of how this problem can be overcome. They recall a case where an expert insurance claims adjuster was about to retire. The claims adjuster had an exceptional record for detecting fraudulent claims, based on intuition, or what Schoemaker and Russo refer to as "*automated expertise*" (p54). The person was unable to explain how she made her decisions, although she could say what information she used to make her decisions. Informal decision aids that avoid biasing effects in heuristics are apparently common in experts (Shanteau, 1988). In this instance asking the claims adjuster to consider a wide selection of insurance claims and attach a value, or weighting, to each of the criteria that she considered, captured the expert judgement. With this data it was possible to statistically infer what the appropriate weights were, and capture valuable expertise before it left the company.

Intuitive decisions are quick and simple, but two flaws can commonly be identified in intuitive decision-making; they are random inconsistencies and systematic distortion (Schoemaker and Russo, 1994).

3.5.1.1 Random inconsistencies

This flaw, random inconsistencies, occurs in expert and non-expert alike. It takes place when the decision maker is required to use personal judgement without a properly defined benchmark. There are many examples cited in the medical field (Carroll and Johnson, 1990; Schoemaker and Russo, 1994), although the phenomenon may be evident in all decision situations. As an example, consider the situation when a person receives medical diagnosis, which is inconclusive, then later asks for a review of the diagnosis. It is not uncommon for the second diagnosis to be different from the first. The variation in diagnosis is usually not attributed to lack of knowledge, particularly in the case of experts. It may be due to making a relative judgement by comparing the case with other recent cases (Carroll and Johnson, 1990). There are other possible causes. Schoemaker and Russo (1994) refer to a test of radiologists, which demonstrated a 23% chance of a diagnosis being changed to support their claim that “*people often apply criteria inconsistently*” (p.4). They attribute this possibility to mental limitations caused by perception and memory, and the effects of distractions and fatigue.

3.5.1.2 Systematic distortion

It is common to consciously, or subconsciously, apply a weighting or bias to information as it is obtained. Most people accept for example, that ‘first impressions count’, and will try to make a good impression at job interviews to influence a prospective employer’s decision. Another common example is the tendency to attribute good decision outcomes to the decision maker’s personal performance, but attribute bad outcomes to external factors or even ‘bad luck’ (Schwenk, 1995; Targett, 1996). The mental limitations, identified by Schoemaker and Russo (1994) also apply, as Golden (1992) found when studying executive’s recollections of their past decisions. Executives recalled decisions as being more rational and consistent than they actually were. Schwenk (1995) found similar results and concluded that executive’s distorted memories would prevent them from learning from their mistakes.

The deficiencies of intuitive decision-making are well recognised, and can be reduced by adopting the normative guidance of heuristics (Kahneman, *et al.*, 1982).

3.5.2 Heuristic decision-making

Informal analysis of information requiring a decision often permits the use of 'rules of thumb', known as heuristics, that are derived from the decision maker's past experience. This kind of decision-making is quick and effective when an approximate answer is sufficient, or is required to gauge the validity of a complex calculation. Two types of heuristic are recognised, heuristics that take the form of rules or set procedures, and heuristics that are the cognitive short cuts formed by a decision maker (Schoemaker and Russo, 1994; Tversky and Kahneman, 1974)

3.5.2.1 Rules

Heuristics as rules or set procedures are commonplace; society runs on rules. Professional organisations have established rules for the guidance of members, businesses use rules to establish standards. For example a bank manager is bound by a set of rules, established by the bank, when considering a loan application. There are also less formal generic rules, the dictionary rule and the threshold rule for example, that are simple strategies to enable people to gain speed and accuracy in decision-making. The dictionary rule is a simple ranking procedure [sometimes known as lexical ordering] in which choices are listed according to some predetermined, important criteria, such as cost. Then the selection, say the first five, are ranked again according to the next most important criteria, and so on until a final selection that meets all the predetermined criteria is reached. This generic rule gives most importance to the first ranking, and therefore it is only sensible to use it when the decision criteria can be ranked in order of importance. The threshold rule is the one the bank manager would use when assessing an application for a loan; for example does the applicant meet an established set of criteria. It is also a useful rule for guidance. For example in screening a large number of tenders a set of criteria may be established to eliminate those that do not meet minimum requirements (Schoemaker and Russo, 1994).

3.5.2.2 Cognitive short-cuts

Heuristics that take the form of cognitive short cuts can guide the decision maker towards rational and consistent decision-making. Tversky and Kahneman (1974) defined three specific classes of heuristic, representativeness, availability, and anchoring adjustment, which are used by people in their assessment of probable outcomes when making decisions. Although there are other kinds of heuristics, these three illustrate the concept and are, I think, sufficient to explain how heuristics operate.

3.5.2.3 Representativeness

Many decision-making situations require an assessment of whether an object, event, or person is associated with a larger group. That is, are they similar to or representative of others? For example is it possible that because A resembles members of group X that A is also a member? Judgement is made on the basis of how closely a person, or an object, resembles the group with which they are being compared. In attempting to assess a person's occupation from their appearance for example, a comparison with stereotypes may be made (Tversky and Kahneman, 1974).

Representativeness, or similarity, can suffer bias because it does not consider fundamental probability factors such as base-rate, sample size, chance, predictability, validity, and regression. Experts who use informal decision aids may be countered this bias (Shanteau, 1988).

3.5.2.4 Availability

The ability to relate to known examples, such as similar occurrences of the same experience, is a useful clue for assessing frequency or probability of events (Tversky and Kahneman, 1974). Successful use of the availability heuristic is dependent on the person's ability to retrieve instances of actual occurrence, or to imagine the occurrence of instances not experienced. Therefore, experts, because of their intense knowledge and experience within their domain of expertise, should be able to make better use of the availability heuristic than non-experts.

Bias is possible when availability heuristics are used. This may occur when a decision maker has recently experienced a similar event to that which they currently face, causing them to perceive the probability of the event occurring to be high. Conversely if they have no prior experience of the event occurring then they may view the events occurrence to be unusual, and the probability of a reoccurrence to be low.

3.5.2.5 Anchoring adjustment

Anchoring is most easily recognised when a prior position has been established and the decision maker has to move away from it. Apparently decision-making is to many people a process of making an estimate and then adjusting it in accordance with additional information (Tversky and Kahneman, 1974). Experts are thought to be able to make appropriate adjustments. They are apparently aware that resistance to changing a decision is often not a good strategy, and therefore use feedback to make corrections (Shanteau, 1988).

Anchoring bias may be present if a person has prior knowledge of a subject and has established a personal opinion on that topic. It will take very strong evidence to persuade them to alter their position. Inappropriate or inaccurate starting positions tend to bias the adjustment towards the initial position (anchoring) and Tversky and Kahneman (1974) found that “*adjustments are typically insufficient*” (p. 1128).

In conclusion, when heuristics are used wisely they are apparently useful aids for decision makers (Tversky and Kahneman, 1974). However, the use of heuristics may introduce personal biases. This can cause sub-optimal information processing, leading to incorrect decisions being made.

3.5.3 Problem identification

Identification of a problem's existence happens when the decision maker's environment indicates that perceived goals, needs, and values are not being satisfied. The goals, needs, and values that influence the decision maker to recognise the problem are determined by psychological precepts that have been

established either as a physiological component of personal cognitive development, or through social/cultural influence and experience. Having identified that a problem exists, the decision maker will begin a problem solving process, which will call on his/her experience and knowledge in an attempt to find an answer to the problem. At the completion of the cycle the decision maker will have accumulated additional decision-making experience and probably new knowledge. This will influence the processes involved in determining future goals, needs, and values, and in turn problem identification and problem solving processes (Kleindorfer *et al.*, 1993).

There are two types of problem finding, or problem identification, reactive and proactive (Smith, 1988). In reactive problem identification, recognition is triggered by an external influence such as a person or an event. Proactive problem identification implies that the decision maker initiates the process through introspection. Either reaction takes place in response to a comparison between the perceived existing situation, and that which the decision maker believes to be desirable, or necessary.

Some decisions are made out of necessity, because a problem requires rapid resolution. For example if my car is stolen I will need to replace it requiring decisions that were not anticipated and are reasonably urgent or time constrained. Some decisions are made by choice. The decision maker chooses to make a change in some thing, or situation, that is not in need of change. If for example I choose to change my car for a new one, this will require decisions that are not urgent unless I choose to make them so.

3.5.4 Problem framing

An understanding of the concept of framing (Bazerman, 1983; Tversky and Kahneman, 1981) is important in a consideration of decision-making, particularly a behavioural perspective on decision-making. Framing takes place through the establishment of a set of basic assumptions by the decision maker. When a frame is established it provides a reference point for the decision maker, and it justifies and explains to the decision maker why he/she is behaving as he/she is.

Consequently framing not only helps a decision maker to understand his/her immediate difficulties, it conveniently categorises information for storage and future retrieval. Tversky and Kahneman (1981) acknowledge that the psychological factors involved in framing are important, but restrict their work to mathematical models without offering any explanation of the psychological factors; this is of little value (Eppen *et al.*, 1993). There is a need for a descriptive evaluation of the psychological factors drawn into action within the decision maker's frame.

3.5.4.1 Blind spots

Framing a problem can be a difficult and frustrating task. A clear example familiar to most people is their first encounter with a maths problem. How fast will a bath fill if the plug is removed and the taps are turned on, so that the water flows in ..., is a daunting question to be presented with when basic arithmetic has just been mastered. However, this type of problem is not a maths problem at all. It is one of problem framing requiring an evaluation, and understanding of what is happening, before any relevant mathematical calculation can be done. The situation presented is often the first encounter with formal problem framing, and the simple calculation of inflow minus outflow is often not conceptualised. This type of problem can be a perceptual blind spot that can prevent a person, no matter what their intellect, from formulating the correct conclusions. From this example it can be seen that the difficulty in answering some mathematical problems is often more to do with discovering the problem rather than with answering it. Experts, working within their domain of expertise, have demonstrated highly developed perceptual ability (Shanteau, 1987). [In the following chapter blind spots are examined in greater detail.]

3.5.4.2 Mathematical framing models

There are prescriptive (normative) mathematical framing models, with associated procedures (algorithms) to solve them (Eppen *et al.*, 1993). However, for them to be useful it is necessary for the decision maker to understand how the models are created, and to understand the relationships between decisions and results. The decision maker then needs to become thoroughly conversant with the models, and how they are used in various situations, before the models can become an integral

part of the person's decision-making repertoire. Despite the lack of descriptive theory, mentioned above, framing is a widely recognised component of decision-making. It is used intuitively by experts to great effect (Mintzberg, 1976; Simon, 1987), and therefore worthy of greater evaluation.

3.5.4.3 Framing effect

Perhaps the most important thing to know about problem framing is that the same information presented in a different form can lead to different decisions being made. This 'framing effect' (Medin and Ross, 1990) is caused by induced perceptual differences. Changing the presentation of information can change the decision makers viewpoint or perspective of the problem, and consequently lead them to reach different conclusions about what is the problem, and in turn cause different action to be taken.

3.5.4.4 Dunegan's marathon model

Since Tversky and Kahneman (1979) raised concern about the biasing effect of framing there have been many studies showing that framing is indeed an important influence on decision-making (Dunegan, 1996). However, most if not all the studies have been laboratory type examinations of decision outcomes. As my research is a non-laboratory, naturalistic inquiry into decision processes these studies are not directly relevant, but Dunegan does introduce one particularly interesting concept that I think is relevant to my research. He compares the continuous decision-making that we all face while we are awake, with running a marathon. To successfully complete a marathon it is necessary to conserve energy by running economically and only applying enough effort to maintain the desired pace.

Dunegan suggests that throughout the day we perform a similar conservation of mental energy by selectively applying different levels of mental processing, what he calls "*cognitive modes*" (p.188). These cognitive modes range along a continuum from 'virtually automatic' to 'highly controlled'. As perhaps we would expect, the highly controlled processing of information is according to Dunegan, the most demanding on mental energy and time, and also the most difficult to employ. Therefore, Dunegan suggests, there is a tendency to avoid the highly

controlled mode when possible, by moving along the continuum towards more automatic information processing, which is more sparing of energy. The price paid for this energy conservation is, according to Dunegan, a loss of recallable knowledge. He claims that in attending less to the information, and being less thorough in its analysis we provide our memories with less information to store for future problem recognition. The factor that apparently determines which cognitive mode is chosen appears to be the perceived threat of the information to the decision maker's objectives. Therefore, as Dunegan states, it is the perception, or framing, of the information that determines the response.

3.5.4.5 Experts may be different

The cognitive modes concept presented by Dunegan, is an example of the consequences of the framing effect mentioned earlier, and clearly identifies its importance in decision-making research. Of particular importance to my research is a comparison between Dunegan's cognitive modes concept and the decision-making processes of experts. I mentioned in the previous chapter that one of the characteristics that separate experts from non-experts is experts' ability to process information automatically (Shanteau, 1987). Additionally, experts have been shown to have superior perceptual ability, which presumably enables them to more accurately frame problems. However, Dunegan argues that as a decision maker tends towards automatic information processing there is a reduction in retained information. Though logical, this argument appears to contradict the observed behaviour of experts. Ericsson (1997), Hammond *et al.* (1987), Shanteau (1992), and others have indicated that during the continual decision-making process experts are constantly acquiring information to enable them to identify future problems. Maybe Dunegan's argument does not hold for experts. During the long apprenticeship required to develop expertise, an expert develops a subconscious ability to identify and retain potentially important information for future use. Shanteau (1992) and Ericsson (1997) have shown that experts perceive, identify, and select appropriate information for problem solving with greater skill than non-experts. Possibly this ability is so highly developed that the selection process persists to enable the automatic retention of relevant information.

3.5.5 Context

The setting in which a decision takes place is often interwoven with that decision, to the extent that separation of the decision from its setting may cause the decision's *raison d'être* to become obscure (March, 1994). Knowing and understanding why a decision needs to be made enables the decision maker to form an appropriate response (Kleindorfer *et al.*, 1993). Context, as the setting is called, is a critical component of any decision-making situation (Einhorn and Hogarth, 1981). In even the most simple laboratory study, the decision maker must have a goal to be able to make meaningful responses. In a naturalistic enquiry, such as in a managerial setting, context is the fabric or structure that frames the decision and the decision maker (Lincoln and Guba, 1985).

Context is an umbrella term that covers many situations. A search of some recent management journals provided numerous instances of an author qualifying his/her research enquiries with the statement 'in a decision-making context'. Within the decision-making context there are other contextual influences, such as risk or consequences resulting from a decision (Kleindorfer *et al.*, 1993). Culture, personality, and organisational politics are additional contextual elements that require consideration in any naturalistic enquiry (March, 1988; Lincoln and Guba, 1985).

3.5.5.1 Risk or consequences

The cognitive modes concept discussed earlier (Dunegan, 1996), is an attempt to explain how a decision maker reacts to information requiring a decision. In essence it suggests that the more threatening the information is to the decision maker's goals the greater the effort made by the decision maker to ensure a suitable resolution to the problem. Dunegan's description of the decision-making process can be seen as a partial restatement of the subjectively expected utility theory (SEU) that was discussed earlier. When a decision maker is working at the highly controlled end of the cognitive modes continuum, it could be argued that the decision maker is in an extreme risk averse state and consciously attempting to make the most rational decisions possible. As the perception of risk recedes, the decision maker may, according to Dunegan, be willing to rely on the more or less

automated responses to decision-making situations that have been identified by other researchers (Simon, 1987; Hammond *et al.*, 1987). The consequent changes in cognitive mode are contextual changes that influence the decision maker's perception and response to situations.

A change in cognitive mode does not imply that the decision maker's risk aversion will alter, only that he/she may be willing to consider solutions that may be less optimal. Risk aversion has been studied for many years, and there is a large literature related to the topic (Kleindorfer *et al.*, 1993). Essentially, risk aversion is an assessment of a person's willingness to accept a loss. The betting odds on which a person is willing to risk money, or the cost that he/she is willing to pay for insurance to offset a loss, are examples of situations in which risk aversion may be assessed. Risk, and the willingness to accept it, is part of the context in which decisions are made.

A decision maker's personal disposition determines how he/she will respond to risk and other factors that make a decision-making situation (Einhorn and Hogarth, 1981; Tversky and Kahneman, 1974/1981/1986). Personal well being can influence a person's disposition and consequently how he/she will respond to information that is presented (Weiner *et al.*, 1977). A person who is stressed by circumstances not related to the immediate decision may be influenced by those circumstances to make decisions that are markedly different from the decisions that he/she would make under less stressful circumstances (Simon, 1987). However, personal disposition is also determined by personality and culture (Barnouw, 1985).

3.5.5.2 Culture and personality

The influence of culture and personality on the individual, are discussed in the following chapter [Chapter 4 Psychological Factors]. Here I discuss the role of culture and personality as context in which the decision maker must work.

Ethnologists (cultural anthropologists) and cross-cultural psychologists study culture (Barnouw, 1985). Ethnologists conduct field studies in which they observe and interview people. Cross-cultural psychologists, like most psychologists,

conduct controlled experiments, and conduct surveys, which provide data for statistical evaluation. Through these distinctly different approaches, much has been learnt about the importance of culture to humans. Now, as a result of extensive research, Shore (1995) is able to argue that culture is an intrinsic part of the human mind.

3.5.5.3 Ethnologists

The idea that anthropologist should consider the human mind, until recently the exclusive territory of psychologists, is relatively new and apparently still somewhat contentious (Strauss and Quinn, 1997). In the past ethnic groups and distinct cultures only rarely came into contact with one another, so it was reasonable to consider them as distinct entities. Increasingly, through ready access to travel and mass communication media, distinctions between the old established cultures based on race are slowly being eroded. Anthropologists are now reporting cultural meanings which are context dependent, and often they are finding that cognitive psychology and personality theory provide an insight that was not previously available to them (Barnouw, 1985; Hofstede, 1997; Strauss and Quinn, 1997).

3.5.5.4 Cross-cultural psychology

A recent addition to the discipline of psychology is cross-cultural psychology (Segall *et al.*, 1990). The topic was a natural outcome from a growing awareness, in the 1970's, that a North American – European perspective did not account for all the diverse cultural settings in which people live. Cross-cultural psychology can, according to Segall *et al.*, be defined as the scientific study of the ways in which social and cultural forces shape human behaviour. This definition implies that sociocultural context will shape human behaviour. Therefore to understand human behaviour requires an understanding of the context in which that behaviour takes place (Pandey, 1990).

3.5.5.5 Sociocultural contexts

There are numerous sociocultural contexts. They can be as small as a family unit, or as big as a nationality or an ethnic group (Segall *et al.*, 1990; Strauss and Quinn, 1997). In management one obvious sociocultural context to be considered

is the 'organisation'. My study is, as I mentioned earlier, concerned with individual decision-making, so I do not want to consider organisational culture, or its effect on decision-making, but I will briefly examine the organisation as a context in which individuals make decisions.

3.5.5.6 Organisations

Some authors distinguish between behavioural decision-making and organisational decision-making (Shapira, 1997). They identify behavioural decision-making research with laboratory studies, which they see as the work of psychologists. In contrast they regard organisational decision-making research as a naturalistic enquiry that is the domain of academics who are management specialists. One notable exception is Herbert Simon (March, 1987). Simon has written extensively on decision-making, concentrating on the actions of the individual no matter what the context. He does, however, acknowledge the importance of context, particularly in his writings on management decision-making (Simon, 1979b/1987). Decision-making, in any context is dependent on making sense of information presented (March, 1997; Strauss and Quinn, 1997). In an organisational setting the individual decision maker faces decisions that have multiple contextual influences (Langley *et al.*, 1995). These influences will determine whether a decision maker identifies a potential decision-making situation, and how a decision maker will frame that situation for the decision-making process to take place (Payne, 1997). Within the organisational setting contextual influences such as culture, personality, and personal well being, continues to influence decision-making, but an additional, and very powerful contextual influence, politics, pervades all decisions within an organisation (Salancik and Brindle, 1997).

3.5.5.7 Politics

The study of experts is a study of individuals, and an awareness of factors that affect the individual is warranted, if only to be able to distinguish between environmental effects and normal personal performance. Therefore it is necessary to consider the influence of politics on decision-making. Decision-making often takes place in social or organisational settings that are influenced by politics, and this is the setting in which experts working as managers make decisions.

In discussing normative theory earlier in the chapter, I mentioned that politics is one of the factors that contribute to the confusion faced by decision makers. I referred to the garbage can model (Cohen *et al.*, 1972) to describe an environment in which decisions are made by a random blending together of the available ingredients. The garbage can model attempts to encapsulate organisational decision-making. It suggests that organisational decision-making is a meeting of occasions, answers, people concerns, and people. Within this model there are all the ingredients that form the political aspect of decision-making. Politics is the network of peoples relationships involving authority, power, or influence within an organisation and organisational politics clearly impinge on the individual. Consequently the decision-making situations that are faced in the ‘real world’ can be described as “*an interweaving of boundedly rational and political processes*” (p. 17) (Eisenhardt and Zbaracki, 1992).

3.5.5.8 Political perspective

A political perspective on decision-making was developed to consider the influence of power on decision makers. It grew from the political science literature in the 1950’s, and was accepted by March in 1962, and others followed (Eisenhardt and Zbaracki, 1992; March, 1994). The main assumption is that organisations are groups of people with conflicting and/or competing interests, caused by their position within the organisation, and their personal ambition and interests. Simply put, within organisations, decisions follow the desires of the most powerful people. However it is presumed that the individual decision makers within the organisation are rational decision makers; it is when they become party to organisational politics that their rationality is questionable (Eisenhardt and Zbaracki, 1992).

3.6 Chapter summary

Much of the research into decision-making is based on the assumption that an optimal model derived from normative theory is a better representation of the problem, than that of the person faced with the problem (Einhorn and Hogarth, 1981). However, it can be argued that the person’s model, the model created from the person’s perception of what is the problem, is more appropriate than the

optimal model (March, 1978). This is particularly so because people do not think or work in accordance with rational models (Isenberg, 1984). People with extensive training and experience in any discipline can be expected to know and to understand the principles of rational thought and optimal models, but it is unlikely that they think in ways that can be simplistically viewed as rational, although in hindsight the decisions that they have made may appear to be rational. People who are experts may have internalised the analytical process to the extent that it is automatic, and therefore be able to process large amounts of information intuitively (Simon, 1987). Consequently experts may focus attention on the process of making a decision rather than on the actual procedure to be followed; he/she will act intuitively to initiate the decision-making process then manage the process making further intuitive adjustments as required. Experts' normal environment involves a portfolio of simultaneous, interrelated problems competing for solutions. The cognitive task becomes one of problem management, requiring the identification and definition of problems, then decisions about which problem to deal with (Isenberg, 1984).

In this chapter decisions of certainty, uncertainty, risk, and conflict have been identified as the potential types of decision that an expert could face (Schoemaker and Russo, 1994). However, in 'real' decision-making situations a clear distinction between types is not to be expected. Most decision-making situations will be a volatile mix of some, or possibly all of the types (Kleindorfer *et al.*, 1993).

CHAPTER 4



Psychological factors

The literature examined in Chapter 2 indicates that experts working within their domain of expertise are better decision makers than non-experts. From that chapter the overall impression is that experts either have, or develop, different decision-making abilities from those of non-experts. Additionally, in Chapter 3 there is an indication that an individual's decision-making ability is influenced by psychological factors. This chapter builds on those earlier reviews by considering the influence that differences in mental processing have on the way decisions are made, and the psychological factors which may determine how experts process and respond to information during the decision-making process. A discussion of relevant psychological factors is essential, but they have vast literatures and are specialised areas of study and therefore cannot be covered in detail, consequently what is covered in this work is no more than an acknowledgement of their importance.

This chapter is in four parts. It begins with a brief discussion about cognitive ability, and then the second section considers the psychological characteristics that are said to be representative of experts. The third section of the chapter examines the psychological factors that are an essential part of the behavioural perspective on decision-making that was discussed in the previous chapter. In particular personality, culture, and cognitive style are considered. The final section of the chapter examines the influence of psychological factors on

previously identified decision-making variables such as heuristics and problem framing.

Although most of what is discussed is now interdisciplinary, - because it is accepted knowledge in psychology, philosophy, management science, and economics, - it is however, grounded in psychology and the testing and evaluation methods are still largely psychometric tools.

4.1 Cognitive ability

Cognition refers to the mental processes that allow an awareness and understanding of our personal environment. Humans acquire this awareness through perception, intuition, evaluation, and reasoning (Weiner *et al.*, 1977). The effects of cognition are readily seen in the application of existing knowledge to new circumstances, problem solving, and creative thought.

It is well accepted that cognitive ability is a distinctive feature that identifies and separates individual performance (Medin & Ross, 1992). There are numerous tests that have been developed in an attempt to assess an individuals' cognitive ability. Most people are familiar with IQ tests of the type developed by Cattell, Binet, and Spearman which attempt to rank personal intellectual ability, and many are sceptical of their value (Carroll & Maxwell, 1979). There are other tests however, that identify individual differences without any attempt to value one over the other. The tests are used to identify individual differences enabling a better understanding of how people respond to situations and what the different responses imply. For example, the embedded figures test (EFT) developed by Witkin *et al.* (1971), has been used by many researchers (Loo, 1978; Noble & Sanders, 1980; Goodenough, 1976) to identify differences in drivers' road traffic hazard recognition ability.

The important issue here is that experts are not expected to have different cognitive abilities from those of non-experts, but they are expected to have developed particular, possibly specific, cognitive functions which enable them to demonstrate the greater proficiency associated with expertise (Shanteau, 1987; Ericsson, 1997).

4.1.1 Information processing

Early studies of the cognitive effects that were thought to determine decision-making processes took an information processing approach which laid the ground for much of the empirical work on decision-making (Medin & Ross, 1992). Information processing research split into two distinct streams, computer based artificial intelligence (AI) and linguistics based psychology. Newell and Simon (1972) were among the first to use computers to try to imitate and learn about cognition. They modelled the heuristics that individuals use to make choices. Subsequently Simon has made important contributions to both cognitive science (Simon, 1979) and decision-making theory (Simon, 1987).

4.1.2 Linguistics

In contrast to AI, linguistics grounded psychology was not based on new technology but on a logical progression of memory psychology. The study of memory had used simple words and often nonsense collections of syllables to evaluate cognition (Neisser, 1967). However, Chomsky's transformational grammar provided new insights that gave the impetus for psychologists to evaluate the memory of sentences and paragraphs, and even whole stories (Medin and Ross, 1992). Memory, and language are essential parts of information processing for decision making and must be considered in any psychological evaluation of expertise.

The study of information processing, both as AI and linguistics, forms part of the interdisciplinary topic known as cognitive science. A consideration of cognitive functions is an integral part of cognitive science research. Most importantly, the

study of experts and investigation into decision-making are important lines of inquiry within cognitive science (Shanteau, 1992).

4.2 Psychological characteristics.

The dilemma faced by decision makers is how to remain sufficiently logical and objective when faced with situations for which they have not only involvement and responsibility, but also strong intuition and passion. Objectivity and logic do not associate comfortably with intuition and passion, they tend to act as a contradiction. Such conflict of interest may produce ‘good’ or inspired decisions, or it may lead to errors in problem definition, and poorly conceived solutions (Leader, 1997). From the study of experts, discussed in Chapter 2, researchers know that expert’s decision-making processes are constrained by domain specificity, environmental cues, and external influences (Ericsson, 1997). However, there are other more personal factors that determine how a person will respond to situations that they may face within their domain of expertise. Expert’s prior knowledge and experience, plus their mental disposition towards a problem will certainly influence how they proceed (Simon, 1979).

Shanteau (1987) identified several highly developed psychological characteristics that experts bring to their decision-making. They can be summarised as follows:

- **Perception.**

Experts have a highly developed ability to recognize and attend to information. Experts can extract information that is embedded in extraneous material and evaluate it.

- **Discrimination.**

Experts have a highly developed ability to concentrate on relevant information, while ignoring the irrelevant.

Experts are adept at recognising exceptional events.

Experts select appropriate problems to resolve.

Experts adapt well to change.

- **Interpretation.**

Experts synthesise information proficiently to make it sensible.

Experts think creatively.

- **Personality**

Experts have a strong sense of responsibility.

Experts have great confidence in their ability.

Experts have high stress tolerance.

Experts have effective communication skills.

The cognitive functions identified by Shanteau are of course no different from those of non-experts. The important difference is that experts have developed the ability to apply them to greater effect. Shanteau did not intend his list of psychological characteristics to be exhaustive and it is not, but it is sufficient to demonstrate the cognitive superiority of experts. Many of the characteristics that Shanteau identified are discussed in Chapter 2 of this thesis, because they relate to expert's decision-making processes. The discussion in Chapter 2 considers the influence that these psychological characteristics have on what experts do. Additionally, in Chapter 3 intuition, bounded rationality, and heuristics are identified as psychological factors that may help to shape the course of the decision-making processes of decision makers (Einhorn & Hogarth, 1981; Teversky & Kahneman, 1974). In chapters 2 and 3, psychological factors were considered either because they differentiated between experts and others, or because they affected decision-making performance. In this chapter they are examined as the behavioural factors that determine the experts actions. Several psychological variables are considered because they help to differentiate and categorise individuals, and they may help to explain why decision-making processes differ between individual experts.

4.3 Behaviour in decision-making

Decision theory has well-established models that provide a guide to how decisions ought to be made [normative theory], and how they are made [descriptive theory]. There are of course deficiencies, and inadequacies in decision-making research for which solutions are being sought. One area of research that has been identified to be in need of further study by several prominent researchers is, what has become known as, the behavioural aspect of decision-making (Eisenhardt & Zbaracki, 1992; Langley *et al.*, 1995; Schwenk, 1995). The behavioural perspective considers the personal variables that the decision maker brings to the decision-making process, such as personality, culture, and cognition [cognition includes perception, memory, attention, knowledge representation, etc.]. Each variable contributes to the complexity of the decision maker, and an awareness of their influence is valuable knowledge when studying expert's decision processes (Ericsson, 1997).

The behaviour of decision makers has been studied in laboratory experiments for many years (Ericsson & Smith, 1991; Simon, 1966). There has also been considerable discussion and theorising of how decision makers behave in organisations (Mintzberg 1979; 1989). However, but there is little information available about individual decision makers in their normal decision-making environment (Lipshitz, 1994). Consequently, several authors have called for further research on the behavioural aspects of decision-making because it is, they say, one of the largest challenges in the future of decision-making theory (Eisenhardt & Zbaracki, 1992; Korhonen & Wallenius, 1996; Langley *et al.*, 1995; Schwenk, 1995). Researchers who adopt methodologies from other disciplines for their own research purposes are meeting this challenge.

An example of this approach is the recent work by Huff (1990), a strategic management analyst, using cognitive mapping techniques developed from Kelly's (1955) work in psychology. Cognitive mapping in various forms is now frequently used in management research. Ginsberg (1994) evaluated the value of cognitive maps as a tool for strategic decision-making, and Swan (1995) considered the utility of cognitive mapping techniques for anticipating the

problems that may arise from management cognition. However, Eden *et al.* (1992), are critical of some current use of cognitive maps, including the work of Huff, which they see as simplistic and superficial, and not requiring, or using, the power of cognitive mapping. Cognitive mapping was adopted, used and further developed by Eden *et al.* (1979) within the discipline of Operations Research where they extended its use to the evaluation of management teams.

Innovative researchers are combining other aspects of psychology theory to aid them in their search for a better understanding of decision makers. A Cognitive Style Index, developed by Allinson and Hayes (1996), a Personal Style Inventory, developed by Taggart (1993), and a Cognitive Style Analysis, developed by Riding (1991), are some examples of recent management research based on established psychology theory.

Earlier in the chapter it was mentioned that awareness of our personal environment is mediated by cognitive abilities, such as perception and reasoning. This awareness is strongly moulded by our personality and cognitive style, and by the culture to which we belong. Personality and culture are distinct topics in several academic disciplines; each with its own literature, and a thorough review is beyond the scope of this thesis. Consequently only a synopsis of these topics will be presented in this chapter. Cognitive style is more specifically a psychology topic. It is less well understood outside psychology and therefore warrants greater explanation in this chapter.

4.3.1 Personality

All people are to some extent personality psychologists. We assess the people we interact with, even people we have not met, such as TV stars, and formulate our own ideas of what they are like as a person. Most people have their own theories about 'types of people' such as fat people, or short people, about being submissive or assertive, etc. Personality psychologists assess people on the basis of these dispositions (Weiner *et al.*, 1977), and formulate theories to explain them. Psychologists identify a person's inclination toward specific dispositions, called traits, and then by selecting interrelated traits the psychologist is able to indicate a

personality type representative of the person (Eysenck & Eysenck, 1985). Personality, according to Eysenck and Eysenck is, “*a more or less stable and enduring organisation of a person’s character, temperament, intellect, and physique, which determines his unique adjustment to the environment.*” (p9) Personality is recognised as a large taxonomy of traits, and types. Eysenck and Wilson (1975) claim that there are in excess of 4000 traits, and Jung defined 32 types (Myers, & McCaulley, 1986).

Weiner *et al.* (1977) define personality as an organisation of traits, or personality dispositions, that are characteristic of a person. The traits are complex composites of irrational tendencies, reflexive actions, rational capacities, and meaningful experiences that form the image people project to others, and colour our interpretation of the image projected by them. Personality is considered by most psychologists to be moderately stable and consistent (Eysenck, 1994). Unlike moods and emotions, which may change dramatically within a short time period, personality tends to endure.

The literature on personality can be traced to the Greek philosophers Theophrastus and Hippocrates (Eysenck & Eysenck, 1985). Theophrastus preferred the literary descriptive method to record his observations of personality and individual difference. Today researchers know this as the ideographic method which says that each person is a unique combination of characteristics and so can not be ranked or ordered. Hippocrates established a classification, which can be compared to modern scientific method. Hippocrates’ highly successful typology was based on careful observation and provided a model for scientific investigation that has lasted over 2000 years, known as the nomothetic method.

Freud, Jung, Maslow, Kelly, and others have developed theories to explain the observable differences in human response to the environment (Medin & Ross, 1990; Weiner *et al.*, 1977). Freud’s assumption that the ego determined human response to the environment was rejected quite early by other psychologists who thought that the stimulus response model failed to account for motives, abilities, interests, and temperament (Goldstein & Blackman, 1978). Maslow’s humanistic theories have been used extensively in management research. No doubt all

students of management will have been introduced to Maslow's Hierarchy of Needs. Kelly (1955) pursued the nomothetic method established by Hippocrates, to study personality. Nomothetic method believes that human differences have dimensions that can be measured, and is the justification for the host of measures that now exist to measure personality traits, including Kelly's Repertory Grid Technique. Jung suggested that apparent random variation in human behaviour, may in fact be a quite orderly and consistent behaviour that is due to basic differences in the way individuals prefer to use their perception and judgement (Myers & McCaulley, 1985). Jung's theory of psychological type was adopted and modified to form the Myers-Briggs Type Indicator (MBTI), a widely accepted method for indicating personal preference in information processing (Allinson & Hayes, 1996).

The theories of Jung and Kelly are, as noted above, the foundations of two tests, Myers-Briggs Type Indicator and Repertory Grid Technique. Both measures have been widely used in decision research, justifying some further discussion on their design and function. The two tests are discussed below.

4.3.1.1 Myers-Briggs Type Indicator (MBTI)

The MBTI, based on Jung's theory of personality types, is according to Allinson and Hayes (1996), the most widely used psychological evaluation tool in the business environment. The MBTI identifies 16 personality types that represent combinations of preferences. The preferences are thought to influence what people perceive and how they make judgements from their perceptions. It is essential to realise that the MBTI identifies a person's preferred way of responding to a situation, not their only way. The MBTI is intended to identify habitual choice between competing alternatives. Although it is assumed that an individual may use all the preferences, the MBTI is based on the premise that he /she will respond first or most often with the preferred functions or attitudes (Myers & McCaulley, 1985). The MBTI, unlike the Repertory Grid Technique, is relatively straightforward to administer, although it requires approximately one hour to complete. The MBTI is user friendly; it asks respondents to choose from a selection of answers to questions that are posed on the form, and stresses that there are no right or wrong answers. Evaluation of the test results is not a simple

matter, and should only be done by a qualified person, usually a psychologist (Myers & McCaully, 1985).

The test manual explains how the MBTI can be used in counselling, career assessment, and for the assessment of learning and teaching ability. The MBTI has been widely used in business, particularly for personnel assessment. Coscarelli *et al.* (1995), reviewed the assessment of decision-making styles available to human resource development, and found the MBTI to be the most widely used assessment tool. However, the MBTI does not appear to have been widely used in decision-making research. Fitting's (1991) study was possibly the first study to evaluate the influence of personality type on decision-making in a real work environment, often referred to as a naturalistic setting. Fitting 'shadowed' two managers (separately) for five working days to observe what she considered to be the 'decision-making process in action'. The focus of the study was the managers' overt actions, interactions, and behaviour, all of which were compared with their personality type as determined by the MBTI. Fitting observed that personality type had an apparent effect on the decision-making process, in particular it was seen to influence information gathering and information utilisation.

4.3.1.2 Repertory Grid Technique

Kelly (1955) developed a theory of personal constructs based on the premise that a person's psychological processes are guided by the ways in which he or she anticipates events. Unlike Jung, Kelly developed his own procedure for evaluating personal constructs. The test, which he called the Role Construct Repertory Test (Rep Test) to elicit associations, or constructs in Kelly's terms, which were intended to allow hypotheses to be formed about the subject's personal-social behaviour.

Kelly used the data to form a 'tabular analysis of the raw protocol' in a grid form, and suggested that the information should be thoroughly evaluated to see something of what the respondent is telling the enquirer, before subjecting the data to statistical analysis (Fransella & Bannister, 1977). When the evaluation of the written material is complete a statistical analysis may be carried out. In 1955

statistical analysis of the grids, which could be 19 by 22 or larger, was an extremely difficult procedure. Grid analysis is now usually carried out through the application of a dedicated computer program.

The Repertory Grid Technique is complex, as indicated above. It relies heavily on the researchers ability to extract complex information from the respondent, and from the written records. Rep Grid also uses mathematical analysis techniques that require processing by dedicated computer programmes (Fransella & Banister, 1977). Nonetheless, the Repertory Grid Technique has enjoyed considerable success, possibly due to the status of its creator, Kelly (1955) and his theory of personal constructs. The Rep Grid has been widely adopted and has many forms (Easterby-Smith *et al.*, 1991; Fransella & Bannister, 1977). Many people have adapted the Repertory Grid Technique to form simplified procedures, which avoid the mathematical complexity but retain the original logic (Stewart *et al.*, 1981).

There were, in the late 1990's, several sophisticated computer programmes available to process the data but they were relatively expensive (NZ\$1500). However, a simple to use and highly sophisticated alternative is available on the Internet. The FOCUS algorithm developed largely by Professor Shaw, Industrial Research Chair in Software Engineering at the University of Calgary (Shaw & Gaines 2001), appears to be a sophisticated program, which is readily available, free for use on the Internet. The site also provides valuable analysis of the data and a wealth of background information relating to the development of Kelly's Repertory Grid and is the home of the web based Personal Construct Psychology (PCP) site with links to many countries including the PCP sites at Wollongong, Australia, and the university of London, UK. Given its development history this software seems to be more appropriate for Repertory Grid analysis than SPSS or SAS, which are more generic statistical packages.

In research relating to experts and decision-making, the recognition of differences between individuals has often not been acknowledged. Many researchers studying expert decision-making have treated 'individual' as a generic term, implying 'the group of individual people', rather than as a single person who may act differently from other individuals (Langley *et al.*, 1995). This is acceptable when

generalisations are sought, but when the results are applied prescriptively, the expected outcome may not eventuate in an single application. Newell and Simon (1972), acknowledged individual differences, *“Each man differs - both in systematic ways and simply by virtue of his unique genetic endowment and historical fate - from all other men”* (p. 3), but consciously excluded motivational and personality variables, which they identified as being separate from the *“cognitive system”* (p .8). However, it seems reasonable to suggest that motivational and personality variables and the cognitive system are inseparable for most research purposes. More recently some authors have called for greater awareness of personality differences and the affect of different personalities on decision-making. (Langley *et al.*, 1995).

4.3.2 Culture

To a non-specialist, the influence of culture on human activity is accepted and taken for granted. For a cultural theorist, things are far from definite. However, for the purpose of my research a simple dictionary definition (as follows) adequately explains the constraints imposed on expert decision makers by their culture. *“A representation of inherited ideas, beliefs, values, and knowledge, that collectively form the basis of social interaction”* (Collins English Dictionary, 1992).

The French Marxist Louis Althusser, believed that ideology actually forms the individual’s consciousness and creates the person’s subjective understanding of experience (Littlejohn, 1992). He thought that the dominant ideology of a culture would subvert other ideologies through social institutions, such as schools, church, and the media. Althusser presented his ideas many years before the advent of mass media. Now that we are exposed to news broadcasts, documentaries, and many other formats that display cultural bias openly, anyone who has an interest in the phenomena can readily observe cultural influence. However, the real circumstances within which we live are not readily understood by us as individuals.

4.3.2.1 Culture's consequences

Due to the immense scale and complexity of the world with which we interact, our position inside our culture and our relationship to the environment is beyond normal comprehension (Littlejohn, 1992). Consequently we have developed coping strategies to facilitate our relationship with society and the environment. The coping strategies are based on our personal interpretation of the ideological framework that exists during our formative years. This influence affects the whole cultural community to some degree, but each person will be influenced in a different way. Hofstede (1984) presented a most comprehensive study of 'Culture's Consequences'. Through observation of cultural differences in forty countries Hofstede identified four main dimensions, which he named as power distance, uncertainty avoidance, individualism, and masculinity. Hofstede claims that these four dimensions give order to dominant value systems within cultures, and influence the thinking of individuals and organisations within those cultures. In his most recent work Hofstede (1997), now extended to cover fifty countries, he uses a powerful analogy to show that culture determines, perhaps more than anything else, how humans behave. Under the title *Software of the Mind*, he compares the human mind to computer software to show that although people are 'programmed' in distinctive ways, it is possible for different programs to have common objectives. As he clearly states, it is common practices not common cultures that solve problems. He suggests that there is a need to understand the differences in values between cultures, and that the differences in practices between cultures must be resolved. Hofstede refers to a wider topic than decision-making by experts, but the logic is as applicable.

4.3.2.2 An irresistible force

Cultural training and experience may cause individuals to follow different paths to satisfy their needs and desires, but humanistic psychologists such as May, Maslow, and Rogers, believe that individuals in different cultures are basically similar and the needs and desires for personal expression are universal (Weiner *et al.*, 1977). Culture is identified as being a strong, perhaps irresistible force that influences individuals' perception of the world that surrounds them. Recognition of this influence supports the widely held view that people react to problems

according to their preconceived cultural notions of what is taking place (Eckensberger, 1995; Hofstede, 1984/1997).

4.3.2.3 Cross cultural considerations

Experts working in another culture face an additional demand. Their original culture will colour their perception of problems faced outside their normal environment, but they may have need to consider influences from other cultures for their decisions to be appropriate (Berger, 1988; Eckensberger, 1995). Experts are frequently exposed to different cultures, particularly now that international travel is readily available. Even within their own country they meet people with different cultural beliefs and experiences (Brislin, 1990).

4.3.2.4 Culture and communication

So far the discussion on culture has followed the accepted knowledge that culture is an internal, mental perception. Another view being considered is the importance of interpersonal communication and material things (Littlejohn, 1992; Toomela, 1996). Littlejohn's monograph (1992), *Theories of Human Communication*, discusses the association between communication and culture at length. He explores various diverse theories and shows that for many communication theories culture is the framework in which language exists. This additional perspective on culture is of particular interest to the study of experts. In most instances experts have to interpret information and act on it, circumstances that require communication and at least the recognition of material things such as symbols and other artefacts.

4.3.3 Cognitive style

Education, motivation, and application do not necessarily lead to success. Raudsepp, (1996) stated that there is strong evidence to indicate that successful people work on tasks that are appropriate for their cognitive style, and this may be a determinant of expertise. This statement was not supported by empirical evidence, but it is apparently a widely held belief, particularly in human resource management (Coscarelli *et al.*, 1995). Cognitive style refers to the distinctive

ways in which individuals conceptually organise the environment, and respond to it (Goldstein and Blackman, 1978).

4.3.3.1 Hemispheric laterality

The study of cognitive style began in the early 1940's, and was somewhat fragmented; Goldstein and Blackman (1978) identified five approaches. Now cognitive style enjoys a more definite position in research; perhaps because recent developments in cognitive psychology, have provided a greater understanding of the innate complexity of the human brain (Medin & Ross, 1992). In particular scientists have known for some time that differing information is processed at different locations within the brain, even in separate hemispheres. For most people verbal and analytical processing appears to happen in the left hemisphere, while spatial and intuitive thinking occur in the right (Taggart & Robey, 1981). This rather simplistic explanation of the laterality of information processing within the human brain suffices to introduce the idea that information processing within the brain is fragmented (Eysenck, 1995). Research has shown that once the information is fragmented a preferential processing treatment may be adopted. During thinking and decision-making different people apparently process the same information in different ways, using different areas of the brain. This may, for example, predispose individuals to tasks that perhaps require analytical in preference to creative thought, or creative in preference to analytical thought. (Eysenck & Eysenck, 1985).

Hemispheric laterality has been clearly demonstrated through biological and neurophysiological methods, where action of the body has been observed in response to stimulation of the brain (Eysenck, 1995). Less direct methods for assessing laterality, based on what has been discovered through biological and neurophysiological, have been pursued to establish associations between apparent lateral brain functions and observed physical activity. The research has pointed to several possible associations between brain functions and observable human performance. Some of the associations are tenuous and still require empirical support, but many of the associations that have been made are supported if not conclusively. Among the more accepted associations is handedness; hand superiority is associated with the opposite brain hemisphere i.e. a preference for

using the right hand is related left-brain dominance because of neural crossover. Hearing and eyesight have similar associations to handedness (Goldstein & Blackman, 1978).

4.3.3.2 Visual field dominance and insight

A detailed study of hemispheric laterality is clearly outside the scope of my thesis, but one recent study is particularly interesting. Bowden and Beeman (1998) reported on an association between visual field dominance and insight. They presented evidence suggesting that right hemisphere dominance assists in the recognition of solutions. Apparently, in response to input words, the right hemisphere “*weakly activates large semantic fields of related information, including information only distantly related to the input word*” (p. 435) allowing insightful associations to be made. The left hemisphere has smaller semantic fields, which consequently do not provide such a strong opportunity for insight to take place.

As visual perception is normally the dominant sense in humans, it is not surprising that information received by the brain via the visual senses is used to define and interpret the environment to which we are relating (Goldstein, 1989). What is interesting is the possibility that a preferential processing system may be in operation that is unique to the individual. It is accepted knowledge that visual information received by each eye is routed to different locations in the brain according to where the stimulus strikes the retina (Frisby, 1979; Hubel, 1988). The idea that visual information is attended to according to brain hemisphere preference determined presumably subconsciously by the individual has implications for the study of cognitive style.

4.3.3.3 The MBTI and cognitive style

The MBTI was discussed under the heading of personality. It is a personality inventory, which as yet, has not been directly related to cognitive action. However, there have been several attempts to relate hemispherical laterality to the Myers-Briggs Type Indicator (MBTI) (Power and Lundsten, 1997). Evidence to support a relationship between type theory (the foundation of the MBTI) and left-brain/right-brain cognitive theory (hemispheric laterality) could indicate that type

preferences are to some extent innate. If type preferences are shown to be innate, then the use of the MBTI as an assessment of cognitive style could be justified, but so far the evidence is not conclusive.

4.3.3.4 MBTI and hemispheric laterality

Shiflett (1989) produced evidence to suggest a correlation between intuitiveness and brain dominance, but the evidence indicates an inverse relationship; intuitiveness should correlate to right dominance not left as Shiflett's results demonstrate. A repeat of Shiflett's study by Taggart, Kroeck and Escoffier (1991) produced the appropriate correlation to support the relationship. However Eysenck (1995) suggests that the results are suspect because Taggart *et al.* based their research on a set of scales founded on data obtained through questionnaires not psychophysiological examination. Eysenck and others have made similar criticism of the MBTI, which is also based on a questionnaire format. The clear difference is that users of the MBTI can refer to a large history of use that supports its validity, whereas the Human Information Processing Survey used by Taggart *et al.* (1991) is not so well supported.

Nonetheless Eysenck indicates that an association between two of the MBTI measures, sensing-intuitive and thinking-feeling, is reasonably established. Left-brain dominance indicates the sensing and thinking types, whereas right brain dominance suggests the intuitive and feeling types as indicated by the MBTI. As mentioned earlier both measures are based on data obtained through questionnaires, so it is important to recognise that the correlation may be between sets of behaviours and experiences, not behaviour and experience with brain activity or location (Eysenck, 1995).

4.3.4 Grouping cognitive styles

Research suggests that individuals can be categorised into groups of thinking, according to their preferential ways of attending to information presented, otherwise known as cognitive styles (Tennant, 1988). Riding *et al.* (1993) classify cognitive styles into families. A Wholist-Analytic cognitive style family and a Verbal-Imager cognitive style family. Each family contains many sub-sets of

constructs that have been developed over the 59 years from the development of Bartlett's Sensory Modality Preferences in 1932, through Witkin's (1962) Field Dependence-Independence to the recent work of Riding (1991). Each cognitive style is independent of the other (there is no significant correlation), but interaction between the two styles has been shown to affect a wide range of behaviours, ranging from learning performance and training preference, to occupational stress (Rayner & Riding, 1997; Riding, 1997).

Cognitive style is a way of thinking that is used to filter and process stimulating information so that the environment takes on psychological meaning (Goldstein & Blackman, 1978). The resultant psychological meaning forms cognitive representations, which the individual uses to respond to, and interact with the environment. Without cognitive representation the stimulus would be irrelevant to the individual, and without the apparent differences in cognitive representation, all human response would be the same. In effect we would behave as automatons.

4.3.4.1 Models of reality

If humans were automatons then perhaps normative decision-making theory as described in Chapter 3 would suffice to explain all decisions (Beach and Lipshitz, 1993). Of course people are not automatons and we produce a variety of responses to any given situation requiring a decision. Even experts working on the same problem may display different approaches to that problem (Willemain, 1995). Furthermore, many decision processes, expert or not, are clearly complex and not readily observable (Langley *et al.*, 1995). A decision can be thought of as a cognitive process that builds a model of reality, evaluates the model, applies available knowledge to derive an acceptable solution, then uses the model to organise appropriate action (Hunt *et al.*, 1989). The reality that is modelled is built from the cognitive perception of the environment that has been created through cultural influences, personality traits, and mentally preferred ways of processing information (O'Keefe, 1989). Preferred ways of mentally processing information is a component of cognitive style.

4.3.4.2 Confusion between personality and cognitive style

Early research produced theories of cognitive style that were based on personality variables (see Goldstein & Blackman, 1978). In trying to understand the complexity of human decision-making, many researchers have adopted cognitive style evaluation as a research tool. However, most research that claims to evaluate cognitive style is actually an evaluation of personality variables. Although the researchers discuss cognitive style, they use personality tests such as MBTI or Repertory Grid Technique to evaluate their data. For example, Hunt *et al.* (1989) used the MBTI to evaluate the cognitive style of undergraduate students in a decision-making situation (see also Kleindorfer *et al.*, 1993; Allinson & Hayes, 1996; Hayes & Allinson, 1994; O'Keefe, 1989; Robey & Taggart, 1981). Personality and cognitive style is not the same thing.

4.3.4.3 Cognitive style and personality

In the earlier section that considered personality, it was stated that personality is “*more or less stable and enduring*” (p. 9) (Eysenck & Eysenck, 1985). However, we are usually to some degree aware of our personality, and on occasion may modify it to suit prevailing circumstances. Additionally the stability of personality variables may be upset, and even altered by unusual or traumatic circumstances. Cognitive style is a more permanent physiological feature. A simple analogy is to compare it with being left or right handed. Most people find that it is extremely difficult to function with their non-preferred hand. Use of the preferred hand has been developed since birth, the nervous system and the associated muscles have developed to support this preference. Cognitive style represents the individuals' preferred use of the ‘nerves and muscles’ of the brain.

Cognitive style is a distinct way of thinking that is used to filter and process stimulus information so that the environment takes on psychological meaning (Goldstein & Blackman, 1978). Cognitive style perhaps describes the processor that provides the information for the personality to act on. It is possible that some personality traits may be coexist with particular cognitive style combinations (Riding, 1997), but apparently there is no suggestion that personality and cognitive style are in any way directly related. They are independent, but they may interact. Having a particular personality type, does not predispose a person to

a particular cognitive style, neither is the reverse necessarily true. However, the individual differences that are identified through cognitive style analysis may underlie, and perhaps help to explain more readily observable human differences (Lewis, 1976; Rayner & Riding, 1997).

There are numerous measures that have been used (not always appropriately as noted above) to assess cognitive style, Allinson and Hayes, (1996) identified at least 28, but three in particular stand out as due to the frequency of their use and/or appropriateness for the purpose. They are the Repertory Grid Technique, the Myers-Briggs Type Indicator (MBTI), and the Cognitive Style Analysis (CSA). The Repertory Grid Technique, and the Myers-Briggs Type Indicator (MBTI) have been discussed under the heading of personality; the Cognitive Style Analysis (CSA) is discussed shortly.

4.3.4.4 Field-dependence theory

Personality, as mentioned earlier, is recognised as a large taxonomy of traits, and types. Cognitive style is different; it is not based on traits or types, but on information processing dimensions. Witkin *et al.* (1971) recognised one dimension, field dependency. Field dependency is a term that Witkin *et al.* used to define differences in personal ability to separate embedded images in the embedded figures test (EFT), which they had developed. In simple terms this is similar to being required to identify a particular sign in an environment that is cluttered with signs, such as a busy shopping area.

Witkin and his associates, with their field-dependence theory, were the first to look towards alternative explanations from personality theories, to account for cognitive perception (Witkin & Goodenough, 1981). Field-dependence theory assumes that differences in cognitive perception account for variations in human response to the environment. Field-dependence testing, using the embedded figures test (EFT) developed by Witkin *et al.* (1971) has been used extensively in research where the focus is on evaluation of visual perception (Loo, 1978; Mykytyn, 1989).

4.3.4.5 Cognitive Style Analysis

The first apparent advance on Witkin's work is the Cognitive Style Analysis (CSA) developed by Riding (1991), which identifies two dimensions to cognitive style, wholist-analytic, and verbal-imagery. Wholist-analytic defines a continuum ranging from identifying the total picture, but not the detail, to identifying specific localised information with out recognition of the total picture. Verbal-imagery defines a continuum that separates people by their preference to attend to information in either verbal or image form. The CSA is described in greater detail below.

The CSA is a modern and technically sophisticated test developed by Richard Riding (1991) at the University of Birmingham, UK. The CSA stands out from other tests that claim to measure cognitive style, because it measures actual performance on visual tasks presented, measured by a computer. The CSA can be described as a simple, user-friendly test from the respondent's perspective. It is a computer presented, interactive assessment of cognitive style which attempts to 'positively assess' both dimensions of cognitive style, that is the Wholist-Analytic, and Verbal-Imagery dimensions described above (Riding, 1991).

The CSA is in effect a measure of human information processing that permits difference in cognitive performance to be identified. Some features of the CSA are in common with Witkin *et al.*'s EFT. The EFT evaluates people by measuring how they actually perform, and requires respondents to identify concealed images embedded within other images. In the EFT the images are displayed on cards, and the test respondent is not permitted to view the image and the figure in which it is embedded at the same time, therefore the EFT becomes a memory test as well as a perceptual one. As the EFT was developed before computers were in common use, the total procedure is carried out manually, including timing the test respondent with a stopwatch. Consequently it is necessary to deny the test respondent visual access to both images simultaneously, because it is possible that the response times would be so quick that they would be more of a reflection of the tester's reaction time than response to the test. In this respect the CSA is a reflection of technological advance (Digman, 1996). The computer records response times as the respondent interacts with the program so there is no need to

conceal information from the respondent, and the requirement for the respondent to memorise the images is eliminated. Additionally, being computer based enables the CSA to perform a quick and accurate evaluation that is much more detailed than the EFT.

The CSA incorporates two sets of figure identification tasks that are similar to the EFT's one set, and the CSA contains an additional evaluation of judgements made from written information. The respondent is presented with a series of short tests, which require him/her to make associations and assessments; based first on written information, then on images. The CSA is self-administering, it takes approximately ten minutes to complete and, because it is self-evaluating, the respondent's report is presented on the computer screen on completion of the evaluation. The report requires interpretation and explanation by the administrator with reference to the manual provided (Riding, 1997).

In developing the CSA, Riding (1991) moved away from the self-report style of evaluation, such as the MBTI, that is the standard research tool for most studies (see Fitting, 1991; Hunt *et al.*, 1989; O'Keefe, 1989; Robey and Taggart, 1981). A major disadvantage associated with self-report systems is that people are often not aware of how they perform in a given situation. This lack of personal awareness leads the person to think, and consequently report, that they are carrying out a particular action when they are actually doing something different (Bromley, 1977). Therefore self report measures record information on how people think they would perform in a given situation when what is required is data that informs about how they do perform. Additional problems with self-report measures arise from social pressure to 'say the right thing', and there is often a lack of motivation to make the necessary effort to respond accurately (Riding, 1995).

4.3.5 Section summary

This section considers the personal variables that the decision maker brings to the decision-making process. Specifically, personality, culture, and cognitive style are examined. The following section builds on this evaluation of personal variables by considering their influence on individuals' decision-making.

4.4 The influence of psychological factors on decision-making

The earlier part of this chapter has examined the psychological factors that influence the decision maker. This final part of the chapter discusses some important psychological factors that influence the decision-making processes.

4.4.1 Intuition

Intuition is used in all phases of the problem solving process (Isenberg, 1984). It is not ‘folk psychology’ but an empirically testable feature of the unconscious mind (Eysenck, 1995) that may be evident in personality or cognitive style.

Of all the characteristics that distinguish an expert perhaps the most distinct is the expert’s ability to produce an intuitive response. Intuition, an unconscious response to stimuli, has received a large amount of attention, particularly from personality psychologists, but also in decision research (Eysenck, 1995). Mintzberg (1989) is certain that intuition plays an important role in expert decision-making, but Simon (1987) disagrees. From his extensive research in the field of information processing Simon concludes that intuition is “*simply analyses frozen in to habit and into the capacity for rapid response through recognition*” (p. 63). However, what Simon identifies is not intuition as it is recognised by those that have studied the topic in more detail (Wescott, 1968; Simon, 1980; Eysenck, 1995).

Wescott (1968) established the foundations for the empirical study of intuition. He is credited with ‘rescuing’ intuition from the mystical status of being beyond the senses (Bruner, 1968), although some people continue to dismiss intuition as ‘folk psychology’ (Cosmides & Tooby, 1995). As Wescott states “*intuition means many things to many people*” (p. 98). For Wescott intuition is “*when an individual reaches a conclusion on the basis of less explicit information than is ordinarily required to reach that conclusion*” (p. 63). This is not Simon’s (1987) ‘analyses frozen into habit’, because that would require all the information to be available. Eysenck (1995) clarifies this point with his definition that “*intuition is a mode of*

cognitive functioning that is located at the opposite end of a continuum from logical thinking” (p. 187). It is distinguished by instantaneous reaction with a few facts considered, what Eysenck calls the “*aha! Experience*”. In Eysenck’s work on Genius, he produces examples of great achievers who he believes combined ‘the gifts’ of intuition and analytical ability, and quotes from Mark Kac the Polish mathematician to separate ‘ordinary genius’ from the ‘magician’. Kac (1985) suggested that an ordinary genius is someone that ‘you or I’ would be as good as if only we could perform at a rate many times better than we do. There is no mystery to the way they work, and when we see what they have done we feel that we could have done it. Magicians are different. How their minds work is to ordinary people effectively incomprehensible. Even when we understand what they have done, how it was done remains a mystery.

4.4.2 Cognitive dissonance

When there is a lack of agreement or consistency within ones thoughts, a condition known as cognitive dissonance exists, and may cause an ‘honest error’ (Leader, 1997). An expert is particularly prone to making honest errors because of their domain specific knowledge. Honest error is most prevalent when a person is attempting to make decisions within his/her domain of knowledge, experience, or influence when there is an emotional content. Cognitive dissonance theory suggests that a person will seek information that agrees with hi/her own beliefs and tend to avoid contradictory information (Festinger, 1957). Additionally, information received that is perceived to agree with the decision maker will be considered to be more valid than information that conflicts. Information that disagrees or conflicts with the decision makers preconceived ideas is likely to be critically evaluated, and perhaps rejected even though it may be both valid and applicable.

4.4.3 Problem framing

The requirement to define a problem in a way that fits with personally held mental references was discussed in Chapter 3. It was mentioned that the decision maker establishes a set of basic assumptions to frame the problem. In this chapter,

because problem framing is a psychological process, I briefly discuss the some psychological implications.

The problem frame justifies and explains to the decision maker why he/she is behaving as he/she is. How problems are framed is determined by a person's cognitive ability. Throughout life people develop memories related to their experiences, and recall those memories to make sense of new experiences (Medin & Ross, 1990). When the first experience takes place, the information presented to the person experiencing it is filtered by their perceptive processes. How that information is interpreted is dependent on individual differences. No two people will have exactly the same perception of events (Goldstein, 1989). Consequently the retained memories will also differ. The memory will determine how the person perceives the problem initially; it will either help or hinder the process of identification. General knowledge structures, known as schema, will come into play as the person tries to make sense of the situation. If the information presented closely resembles earlier experiences the person may be able to call on accurate mental models to cope with the new situation. Training may improve their ability to recognise the relationship, between the immediate problem and passed experience, and lead them to a solution.

However some people never overcome their inability to reconcile the manner in which a problem is presented with the context of the problem. Jung (1963) recalled his difficulties with maths while at school;

"... and I was unable even to formulate the question. To my horror I found that no one understood my difficulty. ...My intellectual morality fought against these whimsical inconsistencies, which have forever debarred me from understanding mathematics. ...All my life it remained a puzzle to me why it was that I never managed to get my bearings in mathematics when there was no doubt that I could calculate properly" (p. 41).

4.4.4 Heuristics

Rules and cognitive short cuts that form heuristics were examined in chapter 3. It was concluded that heuristics are beneficial aids in decision-making provided that there is an awareness of the possible existence of bias. Heuristics that are

cognitive short cuts are particularly interesting because they are associated closely with expert's decision-making processes (Shanteau, 1987). Experts develop expertise through many years of persistent training (Ericsson, 1997). They train highly specific cognitive functions, which undoubtedly facilitates the simultaneous development of heuristic ability (Medin & Ross, 1990). Decision-making is rarely an isolated event. Typically decision-making is an intertwined series of events that can often allow modifications and adjustments to be made to initial decisions on the basis of feedback (Hogarth, 1981). Therefore, because it is quicker, the expert may be content to use heuristically derived decisions to initiate a process, and then make critical adjustments as the process achieves momentum (Medin & Ross, 1990).

4.4.5 Personal commitment

The decision options that managers will consider may be constrained by their own psychological beliefs, which are sufficiently powerful to cause business opportunities to be missed (Donaldson & Lorsch, 1983). There preliminary research indicated that managers were under pressure to maximise shareholder wealth, that their strategic decisions would be subject to the discipline of the capital markets, and that managers would concern themselves solely with investor reaction and expectation. However, they actually found that the prime managerial goal was to ensure the survival of the organisation in which they had invested so much of themselves psychologically and professionally. In essence Donaldson and Lorsch found that people, in this instance managers, have strong personal commitment to protect their own interests.

There is no research that I am aware of that extends the work of Donaldson and Lorsch to consider experts. However, experts take many years to develop their expertise and may become highly committed to their vocation. They are known to have a strong sense of responsibility (Shanteau, 1987), but it appears unlikely that they will be any less committed to protecting their personal interests. Consequently, expert's decision-making may, on occasion demonstrate personal bias.

4.4.6 Blind spots

The subject of blind spots was discussed in Chapter 3 in relation to decision making, in this chapter it is examined from the psychological perspective. Although a person may be aware of events taking place before them, they may not recognise the significance of the event, or they may incorrectly interpret what is happening (Porter, 1980). There are many possible causes, but that which Porter identified is bias introduced by cognitive blind spots. The need to consider the effect of competitor's contingent actions is demonstrated by chess players (Chase & Simon, 1973), and is important in many competitive environments. It is expected that proficient competitors are conversant with this important component of decision-making strategy. However, it has been recognised that highly trained people can be aware of a situation but not recognise important information embedded in the data being observed.

Expert radiographers, who are highly trained in the recognition of pathological information on x-ray film, may not see relevant data (Carmody, Nodine & Kundel, 1981). This inability to perceive important information present in the field being observed is not unusual. Studies of car accidents frequently determine that a driver did not see the object with which they have collided (Mihal, & Barrett, 1976). Aberrations of the type described are not fully understood, but are well-recognised psychological phenomena that have been studied for many years. Driving can be seen as analogous to decision-making in two important ways. First there is a mass of confused information competing for the drivers/decision maker's attention. This requires the ability to extract weak signals from a noisy background (Einhorn, 1974). Second, the driver/decision maker makes decisions that have contingent affects on future events.

It is important to my research on experts' decision-making to note that most of the literature has focused on being aware of competitors blind spots, not personal blind spots (Zajac & Bazerman, 1991). Decision makers need to be aware of their own blind spots to maximise the benefit of decision theorists' prescriptive advice.

4.4.7 Section summary

This section has extended the earlier work of this chapter by considering six psychological factors that influence decision-making processes. They illustrate the importance of understanding that decision-making is more than the application of decision-making rules, as may be concluded from decision-making theory. Decision-making is a highly personal activity that is determined by the decision maker's psychological interpretation of, and reaction to, situations that require a decision.

4.5 Chapter Summary

Several authors have called for further research on the behavioural aspects of decision-making because it is, they say, one of the largest challenges in the future of decision-making theory (Eisenhardt & Zbaracki, 1992; Korhonen & Wallenius, 1996; Langley *et al.*, 1995; Schwenk, 1995). The behavioural perspective considers the personal variables that the decision maker brings to the decision-making process, such as personality, culture, cognition. Each variable contributes to the complexity of the decision maker, and an awareness of their influence is valuable knowledge when studying experts' decision processes (Ericsson, 1997).

Experts, according to the literature, are seen to have highly developed, psychological characteristics such as perception, discrimination, interpretation, and personality, to an extent that distinguishes them from non-experts (Shanteau, 1987). This justifies a greater consideration of what the psychological characteristics are and how they may influence the decision-making of an expert.

This chapter began with a brief consideration of cognitive ability and the psychological characteristics that were identified by Shanteau, before considering some psychological aspects of behavioural decision research; personality, culture, and cognitive style. The final section of the chapter considers aspects of decision-making that are particularly susceptible to the influence of idiosyncratic psychological factors.

CHAPTER 5



Research lacuna

A confluence of the preceding chapters, and the underlying motivation for my research path.

The preceding chapters [Chapters 2, 3, 4] examine the literature relating to experts, decision-making, and human behaviour. In Chapter 2 the literature relating to experts is reviewed in detail. Elements of decision-making theory are reviewed in Chapter 3 that inform on the decision-making processes of experts, and in Chapter 4 human behaviour that mediates experts' decision-making is reviewed.

The first section of this chapter is a synopsis of the preceding three literature review chapters, followed by a brief synthesis of the key elements of those chapters to outline my field of research. In the third section of the chapter I identify and describe several lacunas in the literature. The final section of the chapter is devoted to the development of my research question. The section begins by positioning my research perspective to vindicate my choice of a managerial setting as a suitable context in which to examine the previously identified lacunas. Next, there is a brief discussion of the role of experts as managers. The section concludes with the development of my overall research question, and the five subordinate questions, which determine my research path.

5.1 Synopsis of the literature review

Chapter 2: Experts

In this chapter I posed the obvious question – What is an expert? – as a basis for developing an understanding of the topic, and examined the literature that relates to experts to derive the following answers to that question.

- Experts are people who have committed many years to extensive training and persistent practice in a particular discipline. The development of expertise may take ten years and frequently more. This period forms an important benchmark for the recognition of expertise (Ericsson, 1997, Shanteau, 1995).
- Expertise is generally restricted to the domain in which it develops (Ebbesen & Konecni, 1975). Through their extensive training and experience experts develop particular abilities, which may be domain specific. Away from their domain of expertise experts may not be any more proficient than non-experts. Their skills may be appropriate in a different environment, but due to lack of familiarity with that environment, experts may not be able to locate the critical information cues that enable their expertise.
- As their expertise develops and they acquire better decision-making processes experts become different from non-experts. (Baron, 1988). Experts become mechanistic in their approach to decision-making, acquire an ability to identify the appropriate path to a solution, and they process available information in a non-goal specific manner while working towards their goal.
- Experts have an acute understanding of their domain of expertise. They can perceive information that to a non-expert may be invisible or at least incomprehensible (Shanteau, 1992b). This enables experts to identify and understand information cues that would possibly be missed by a people who are not familiar with the domain.

- Experts are acutely aware of events within their domain of expertise, consequently they can see relationships between cues. Experts can recognise and interpret complex patterns of information and critically discriminate between relevant and redundant information (Shanteau, 1987).
- Experts, because they have a mechanistic approach to decision-making, can select their preferred procedures. Experts are able to manage and manipulate the decision process to accommodate their particular expertise (Klein, 1998).
- Experts, because they are acutely aware of events that take place within their domain of expertise, can form intuitive conclusions about probable outcomes, and therefore possible solutions. Experts rely on intuitive judgement to guide them towards and often provide a solution to a problem (Hammond *et al.*, 1978).
- Experts, because of their familiarity with their domain of expertise, can use intuitive judgement to assess the accuracy of formally derived solutions. Experts are able to assess the accuracy of the decisions that they make as they make them (Kleindorfer, Kunreuther & Schoemaker, 1993).

Chapter 3: Decision-making

Aspects of decision-making theory that may be characteristic of experts' decision-making processes are examined in Chapter 3. Consideration is given only to individual decision-making, as may be encountered in a management role. No attempt is made to explain group decision-making. Furthermore, it became apparent in the previous chapter that expertise is, to a large extent, determined by subjective characteristics, consequently this chapter has a particular emphasis on aspects of decision-making that may be susceptible to behavioural variables.

The conclusions drawn from the literature review presented in this chapter is summarised as follows:

- The study of decision-making has been traced back to the time of Aristotle and Euclid (Suppes, 1984).
- Decision-making is a process, which attempts to find a path from an initial state of problem recognition, to a desired state of problem resolved.
- Decisions may take place under conditions of certainty, uncertainty, risk, and conflict (Schoemaker & Russo, 1994).
- Decision-making theory is divergent (Tversky & Kahneman, 1990). There is normative theory, which prescribes rational actions to resolve problems, and descriptive theory which attempts to explain how decisions are made (Kleindorfer *et al.*, 1993; Raiffa, 1994). A recent addition to decision-making theory is naturalistic theory, which, although it claims to study 'reality', is similar to descriptive decision theory (Doherty, 1993).
- Decision-making can be intuitive or analytical, it can be dependent on heuristics, and it can involve weighting to establish values and/or probabilities (Schoemaker & Russo, 1994).
- Human cognition will apparently have a major influence on the perception of a problem by the decision maker, and on how the decision maker responds to that problem, these are recognised as problem framing issues (Bazerman, 1983; Tversky & Kahneman, 1981). This is particularly important when considering experts. Experts, unlike non-experts, are expected to have ability to process relevant information automatically, thereby conserving mental energy while maintaining a high standard of decision-making (Ericsson, 1997; Hammond *et al.*, 1987; Shanteau, 1992).

- The context in which decisions are made is important information when attempting to understand why the expert makes particular decisions. Risk and consequences, culture, personality, and organisational politics are specific contextual influences (Einhorn and Hogarth, 1981; Kleindorfer *et al.*, 1993).

Chapter 4: Psychological factors

Chapters 2 and 3 indicate that expertise in decision-making is significantly determined by the development and appropriate application of cognitive ability. Consequently in this chapter I examine psychological factors that influence the development and application of cognitive abilities that mediate decision-making. The conclusions drawn from the literature reviewed, that makes up this chapter, is summarised as follows:

- Cognitive ability distinguishes individual performance from that of others (Medin and Ross, 1992). Experts may be expected to have highly developed cognitive abilities appropriate to their domain of expertise (Shanteau, 1987; Ericsson, 1997).
- Perception, discrimination, interpretation, and personality are important psychological characteristics that appear to be specifically, and well developed in experts (Shanteau, 1987). These characteristics are known to be particularly important for the achievement of superior decision-making and an understanding of how these factors differentiate individuals may be beneficial in developing an understanding of why the decision-making processes of individual experts vary.
- There is an identified need to study the behavioural aspects of decision-making, which include personality, culture, and cognitive style (Eisenhardt and Zbaracki, 1992; Langley *et al.*, 1995; Schwenk, 1995).

- The Myers-Briggs Type Indicator, and The Repertory Grid Technique are commonly used tools to evaluate aspects of personality in managerial research (Allinson and Hayes, 1996; Fransella and Banister, 1975; Stewart, Stewart and Fonda, 1981).
- The influence of culture on decision makers is apparently significant and requires consideration in an evaluation of decision-making processes (Eckensberger, 1995; Hofstede, 1984/1997).
- Cognitive style is a term used to define the characteristic way in which individuals process information to make sense of their environment (Goldstein and Blackman, 1978). Cognitive style appears to be a critical issue in the understanding of human decision-making processes (Riding, 1991).
- It is apparent from the literature reviewed that psychological factors strongly determine how decisions are made. Intuition, heuristics, problem framing, and personal commitment are all largely determined by psychological factors (Eysenck, 1995; Goldstein, 1989; Shanteau, 1987).

5.2 Synthesis

Experts have been studied in a large variety of situations to gain knowledge about the nature of their expertise. Provided that the experts are bona fide experts working within their domain of expertise, they have demonstrated definite superiority of performance over non-experts (Ericsson, 1997). They have also shown that their superiority is due to at least ten years specific training and experience within their domain of expertise, which have developed a different and apparently better information processing ability. Overall, the conclusion must be that experts are able to make better decisions than non-experts because the expert uses superior decision-making processes.

Decision-making processes are the research domains of decision theorists. Decision-making research is developing strongly towards a behavioural perspective that considers how the decision maker interacts with the decision-making environment (Orasanu and Connolly, 1993). It is recognised that most often decision-making takes place in a busy and confusing environment in which the decision maker has limited information and restricted ability to use that information (Simon, 1979b), plus the pressures of partially conflicting objectives brought about by political pressures (Eisenhardt and Zbaracki, 1992). To have a proper understanding of the behavioural aspects of decision-making it is necessary to consider process not performance (Lipshitz, 1989). Process, particularly superior process is dependent on the application of appropriate cognitive skills to available knowledge.

Many of the cognitive skills that are associated with decision-making process are known to be better developed in experts than in non-experts (Shanteau, 1987). However, although many of them are observable they are difficult to assess in a way that provides meaningful information about individual decision-making processes. Recent developments in the assessment of cognitive style (Riding, 1991) may help to overcome this difficulty.

In conclusion, it is apparent that decision-making is dependent on particular cognitive functions that have been identified as highly developed in experts. This seems to indicate that experts are better equipped, to be proficient decision makers, than non-experts, which according to the literature, they are (Ericsson and Oliver, 1994).

5.3 The lacuna

5.3.1 Process determines expertise

Despite strong evidence indicating that it is process, not performance, that determines expertise (Lipshitz, 1989), the overarching theme in research that studies experts is performance (Camerer & Johnson, 1991). A preoccupation with outcomes is perhaps understandable. Superior outcomes were expected in the early research, and when they were not evident, expert's performance was denounced as no better than chance (Shanteau & Stewart, 1992). However, subsequent evaluation indicated that particular criteria must exist to permit the display of superior performance by experts. It is now accepted that bona fide experts have particular credentials that can be assessed before their performance is considered, and that they are expert only within their domain of expertise (Ericsson, 1997). Therefore, under the right circumstances experts are capable of better performance than chance (Carroll & Johnson, 1990).

Experts are now accepted to be superior performers, so the continued preoccupation with their performance is overshadowing a need to understand how they process information to achieve superior performance. Some knowledge about process has been obtained. For example it is known that experts process information differently than non-experts; that they are mechanistic rather than goal seeking (Baron, 1988). It is also known, from the study of chess players, that experts call on well established mental models to evaluate problems (Chase & Simon, 1973). However, this knowledge informs on how experts process information, not on why they process it as they do, although it can be assumed that one essential reason is because it leads them to the desired outcome.

The processing of information by a decision maker, trained or not, will most likely follow some personal path. However, trained people, such as experts, can be expected to have some understanding of appropriate decision-making processes. Consequently, understanding why experts follow their personal paths takes on some importance when attempting to gain an overall understanding of their decision-making processes. Three factors that may determine that path;

subjective variables (Einhorn, 1974), subjective characteristics (Shanteau, 1987), and cognitive style (Rayner & Riding, 1997) are discussed in the following sub-sections.

5.3.2 Subjective variables

When experts are studied the research usually considers how the experts perform in some specific task. This may be done through observation or by requiring the experts to account for their actions via verbal protocols or retrospective reporting (Ericsson, 1997). There are numerous studies that have looked at how experts acquire knowledge and at how experts use that knowledge (see Ericsson, 1997, and Klein *et al.*, 1988, for examples). These studies have considered the performance of individual experts as a sample of the total expert population. The research has most often been a mathematical evaluation that focused entirely on supposedly objective data for statistical comparison, and largely ignored individual perception. For example Einhorn's (1974) seminal work on expert judgement used an in depth mathematical analysis of the work of three pathologists to assess 'intrajudge' reliability, construct validity, and judgmental bias. However, although he made no allowance for their existence, he acknowledged that several subjective variables might be present.

Einhorn (1974) identified several subjective variables and their possible effect on outcome. He recognised the possibility of experts being able to describe previously unthought-of methods to carry out activities. He also suggested that a 'real expert' might be capable of locating and associating cues that have not been identified previously. Einhorn chose not to pursue these ideas further. He was satisfied to acknowledge them as parts of a "*creative process that we know little about*" (p. 570). Einhorn also examined the idea that the "*process of information search will greatly structure the task*" (p. 570). He was considering the effect that the individual expert's problem definition and solution finding processes could have on the decision-making process. Again, although Einhorn acknowledged the potential for individual differences to influence outcomes he chose not to pursue it further. Einhorn thought that for his experiment the task was sufficiently structured to eliminate any need to consider individual differences in problem

structuring. However, he did conclude “*in non-experimental settings, this structuring will undoubtedly be of great importance*” (p. 570). Einhorn’s final concern was with the need for agreement between experts, particularly in how they evaluate information. His contention was that experts should agree on what information was present and how it should be valued. However, he recognised that if experts reached appropriate conclusions without agreement on the process then an additional variable must exist to enable them to arrive at appropriate conclusions. Einhorn concluded that “*there may be many routes to the same goal, and there may be more than one way to perform the cognitive tasks involved in judgement*” (p. 571).

Einhorn (1974) acknowledged that individual differences in experts’ perception of information and the subsequent conceptualisation of its meaning is “*undoubtedly of great importance*” (p. 570), nevertheless I have been unable to find evidence that experts’ subjective variables have been studied. Apparently no prior research has evaluated differences in the perception or conception of information leading to decision-making. Indeed individual differences have been overshadowed by individual similarities, because apparently ‘expert’ research has focused on discovering knowledge that informed on the expert population as a whole.

To summarise, Einhorn acknowledged that an expert’s perception of the information presented, and his/her subsequent conceptualisation could influence expert’s decision-making processes. Before they are able to form an understanding of the information, the decision maker must make assumptions about the information presented to them by referring and comparing it to their prior knowledge (Medin & Ross, 1990). This is often referred to as framing effects. The assumptions and subsequent understanding are completely determined by the individual’s unique prior knowledge. Additionally, the presentation of the information influences what assumptions will be made. A subtle change in how the information is presented, such as a change in the order of presentation, may cause different assumptions to be made. Consequently a different interpretation and understanding of the information may be formed. Einhorn’s ‘subjective variables’ can be seen as direct contributors to individuals’ assumptions and to their subsequent understanding when ‘framing’ occurs.

The subjective variables that Einhorn identified are essential knowledge for the development of my research question. For this reason they are set out below.

The subjective variables are:

- (1) Variations in ability to locate and associate cues that have not been identified previously.
- (2) Variations in information searching to define a problem and select a solution.
- (3) Variations in performing the cognitive tasks involved in decision-making.

The differences between the variables are perhaps subtle, but it is important to recognise that they exist and that each one is influenced by the behavioural factors examined in Chapter 4.

5.3.3 Subjective characteristics

Shanteau (1987) examined, in general terms, the psychological characteristics of expert decision-making. He identified the need to analyse “*subjective characteristics*” (p. 297) of experts because he considered that if the objective is to understand experts then all the processes involved need to be studied. Rather than follow the mathematical methodologies of objective analysis, which permit inductive hypotheses relating to experts as a whole to be formed, a subjective evaluation of expert characteristics should focus on individual performance. The critical issue here is that, as Einhorn (1974) mentioned, there may be more than one way to perform the cognitive tasks associated with expertise. This builds on the earlier discussion of subjective variables, which shows that the assumptions made about information presented, can determine its subsequent interpretation and understanding. When there are alternative ways to perform cognitive tasks, the one chosen may be determined by subjective variables. In simple terms, the way the task is framed by the decision maker may indicate to them the appropriate cognitive route to a resolution.

However, despite Shanteau's suggestion that to understand experts more attention should be applied to understanding all the processes that permit expertise, his lead appears not to have been followed. Apparently no prior research examines the idiosyncrasies of experts to determine how or why they perform as they do.

5.3.4 Cognitive ability

Cognitive style research has indicated that successful performance in any discipline may come more easily if the appropriate cognitive aptitude is applied (Rayner & Riding, 1997). This is the basis of aptitude testing, and career counselling.

Decision-making is known to be predominantly a cognitive activity, and experts are accepted as superior decision makers (Shanteau, 1987). Ericsson and Charness (1994) and others have attributed expertise to lengthy practice, and obviously the long period of training that develops expertise must be a significant factor in expert ability (Ericsson, 1997). However as Ericsson acknowledges, practice does not always lead to expertise. Failure to acquire expertise may be attributed to improper practice, but it is clear that all people who train in a specific activity, no matter how much they try, do not become experts.

So what does enable expertise to develop? Einhorn (1974) identified subjective variables, which are interesting but they alone do not seem to suggest an answer. It is generally accepted that people are different, and that as a consequence they respond differently to similar stimuli (Weiner *et al.*, 1977). Shanteau (1987) suggested that the subjective characteristics of experts should be studied. Again, this is interesting but alone does not appear to answer the question of why some people become experts and others do not. Possession of subjective characteristics identifies experts, and helps to explain an expert's actions, but does not inform on why the person is an expert.

There is apparently some additional variable that interacts with the extensive training, subjective variables, and subjective characteristics to facilitate expert performance. Research, which has considered the influence of cognitive style, indicates that in any discipline the application of appropriate cognitive aptitude

can more easily lead to successful performance (Rayner & Riding, 1997). Perhaps this is the missing link. By combining the thoughts of Einhorn (1974) and Shanteau (1987), with recent developments in cognitive style theory it may be possible to show that there is a relationship between experts' overt actions and their cognitive style. Subjective variables and subjective characteristics may alter in accordance with the expert's preferred cognitive style.

Cognitive style is a strong, and stable influence on how a person perceives information and subsequently acts upon it. Consequently, an expert's decision-making processes should demonstrate a strong influence that implicates (or is representative of) that expert's cognitive style.

Furthermore, as I mentioned in Chapter Four, although many researchers have inappropriately used the Myers-Briggs Type Indicator (MBTI) as a tool to assess cognitive style (see Hunt *et al.*, 1989; Hayes & Allinson, 1994; O'Keefe, 1989; Robey & Taggart, 1981) there have been several attempts to relate hemispherical laterality to the MBTI (Power & Lundsten, 1997). Evidence to support a relationship between type theory (the foundation of the MBTI) and left-brain/right-brain cognitive theory (hemispheric laterality) could indicate that type preferences are to some extent innate. This suggests that a consideration of type preferences when studying individual experts may be valuable.

Little significance has been attached to the variations between experts' problem solving strategies, perhaps this is because the differences are accepted as part of the mystique of expertise. However the fact that experts do reach similar conclusions although they follow different paths appears to suggest that experts may choose the path best suited to their cognitive style. In some situations there may be several clearly identifiable paths to a solution, in which case perhaps there is little significance in the choice. However, when the path to a solution is not obvious the expert's characteristic way of thinking, their cognitive style can be expected to dominate the selection process (Hunt *et al.*, 1989). This assumption is based on cognitive style theory (Chapter 4), which indicates that people do have an idiosyncratic way of processing information, and that they may find difficulty in alternative processing methods.

The idea is similar to that of the Myers-Briggs Type Indicator (Chapter 4). The MBTI suggests that people follow their preferred information processing strategies, but may on occasion chose to act in an alternative way (Myers & Myers, 1986). Cognitive style however is not a preference that can be modified at will; it is a more or less fixed characteristic of the individual (Riding, 1997).

Cognitive style could be an important variable in the makeup of expertise. Research suggests that during the brain's continuous process of storing information, representing interactions with the environment, the brain simultaneously forms preferred ways to access and use that information. This is the foundation of cognitive style (Messick, 1976). Studying the cognitive style of experts may lead toward an understanding of why experts apparently follow different paths from one another when determining a problems' solution even though they have identical initial information and reach similar final conclusions. There is no evidence, in the literature, that this line of enquiry has been followed.

5.3.6 The lacuna: a summary

Einhorn, (1974, p. 570) clearly stated that when studying experts decision-making processes in an uncontrolled environment, (such as the 'real world') consideration of how information is structured by an expert will 'undoubtedly be of great importance'. He identified three particular variations in the ability of individuals to processes information, which he called 'subjective variables'. Einhorn's statement appears to support the earlier concern expressed by Simon (1945/1957) that a single isolated individual may not be able to select the optimum solution, and may therefore chose a path that differs from the norm. Although the importance of information structuring has been identified for some time little knowledge of it exists in the literature. In particular the literature does not address the question of how the perception and conception of information by experts in their natural working environment may influence their decision-making processes.

Shanteau (1987) identified the need to consider all the processes involved in human decision-making, to gain a better understanding of experts' decision-making. In particular he identified a need to answer the question of how the

‘subjective characteristics’, or idiosyncrasies of experts, influence their decision-making. This topic appears not to have been addressed in the literature. Answers may elaborate Einhorn’s statement that “... *there may be more than one way to perform the cognitive tasks involved in judgement*” (p. 571).

There is evidence to suggest that success in any endeavour is easier when the appropriate cognitive style is applied (Raynor & Riding, 1997). Perhaps experts are people who maximise the application of their cognitive style to their environment. As we have seen cognitive style is a more or less fixed characteristic of the individual. Therefore, an individuals’ success in any endeavour is dependent using his/her cognitive style to frame problems in a way that enables him/her to reach the most appropriate conclusions, and experts appear to be people who are particularly capable of achieving success in this way.

Studying the cognitive style of experts may lead toward an understanding of why experts apparently follow different paths from one another when determining the solution to a problem, even though they have identical initial information and reach similar final conclusions. However, I have not found any evidence in the literature that the influence of cognitive style on expert’s decision-making has been studied. This third omission in the literature suggests that questions concerning possible relationships between an expert’s information structuring, an expert’s personal characteristics, and an expert’s cognitive style have not been addressed.

I have identified three lacunas within the literature. The question, raised by Einhorn (1974), of how the perception and conception of information by experts in their natural working environment may influence their decision-making processes, has been identified as important for some time. Similarly, the question concerning how the ‘subjective characteristics’, or idiosyncrasies of experts, influence their decision-making (Shanteau, 1985) remains. No study, that I have found, has attempted to answer these questions. Furthermore, no study that I am aware of has examined in cognitive terms, an expert’s personal approach to decision-making.

5.4 The research question

5.4.1 Research motivation, perspective, and focus

In the preceding section I have identified a lacuna in the literature, which appears to be worthy of study. There are many ways that the three interesting topics, subjective variables, subjective characteristics, and cognitive style, can be studied. How they are studied will more than likely be determined by the researchers motivation, research perspective, and his/her particular focus. In Chapter 1, I discussed all three of these issues to justify the path that I have taken in this study. Here I must restate my position to vindicate my research question.

The motivation that lead to this study taking place derived from my involvement in Human Resource Management, and from my academic training in psychology. For many years my occupation, in HRM, exposed me to the diverse nature of human behaviour that is a feature of people in general. My occupation also brought me into frequent contact with ‘experts’. Consequently my research perspective is heavily biased towards considering experts in a setting that I know and understand. As a management psychologist I feel bound by my personal domain of expertise, and therefore inclined to focus on experts who work in that environment. This research focus leads me to conduct my research in an contextual setting that coincidentally appears to have been neglected. Managers who possess expertise do not appear to be uncommon, yet there is apparently very little evidence of research that considers experts working in management. [Note. I draw a distinction between experts working in management and expert managers. The former are experts in domains other than management, and they are my focus in this research. The later do not appear to have been studied, and possibly do not exist in terms of the definition of experts.]

The study of experts has apparently taken place in many different settings (Ericsson and Smith, 1991). This, I believe is mainly a contextual issue which narrows the focus while retaining a consideration of the important issues relating to experts. Consequently I believe that a research setting in which the unit of analysis is an expert working in a managerial role forms a rich contextual

environment in which to study the interrelated actions of subjective variables, subjective characteristics, and cognitive style. Therefore, it is my view that a study that considers experts in managerial positions, as a contextual setting, is appropriate given my background, and is further justified by the evident lack of prior research in the area.

5.4.2 Management research perspective

As a student of decision-making working within a management discipline, one strong reason for studying expert's decision-making is to obtain knowledge that can be used prescriptively to improve the decision-making of non-experts. That is, to be able to inform non-experts about experts' decision-making processes, so that they, the non-experts, can learn how to make better-processed decisions in situations that they may face. Non-experts are most likely to gain maximum benefit from prescriptive information if they perceive it to be relevant, therefore my research must of necessity be management related.

In addition an understanding of both how and why experts act as they do seems to be more beneficial than only knowing how they act. This can be compared with the earlier discussion of heuristics, otherwise known as rules and mental short cuts. Knowing how to act in a given situation is comparable to having rules to follow, which works well if the situation is covered by the rules available. Mental short cuts differ from rules; they require an understanding of what is to be achieved. They enable the application of prior knowledge, experience and understanding to existing situations, and to new and often very different situations.

Mental short-cuts effectively allow associations to be made between old situations and new ones. This suggests that non-experts, equipped with knowledge of how and why experts act as they do, may be better able to apply their knowledge appropriately, not only in prescribed situations but also in novel situations not previously encountered. Again, to be prescriptively beneficial, the knowledge gained must be relevant to a management environment and, I believe, justifies my research being contextually focused on decision-making in a managerial role.

5.4.3 Experts as managers

In Chapter 1, (1.2 Motivation) I stated that the original motivating factor for my research was a consideration of why consultants, people who often have sufficient experience and training to be classified as expert, frequently use different processes to achieve similar goals. The consultants that I had worked with were usually technical experts in a domain such as computing or accounting systems who were employed to manage installations or upgrades in existing installations i.e. the consultants were employed in a managerial role. Over time I frequently observed different experts completing similar tasks in very different ways, but they still achieved the same goal. I formed the opinion that the differences were brought about by the personal characteristics of the expert, because the task was similar to that carried out by other consultants and the environment (domain) did not change. At that stage it was not clear to me what actually distinguished experts from non-experts, although it was clear that the consultants were employed to do work that staff were not able to.

In pursuing this line of thought I carried out a preliminary literature review, which introduced me to work by Einhorn (1974) and Shanteau (1987). Questions raised by Einhorn and Shanteau lead me to pose the following question, - could it be that behavioural characteristics, not training or the setting, determine the path that experts take to resolve a problem?

To be able to consider the behavioural characteristics of experts it was necessary to examine the literature that considers experts. Through the literature review I developed an understanding of domain specific expertise. However, I did not find any studies of experts outside of their domains of expertise.

It seems reasonable to think that aspects of expertise that are determined by cognitive style and personality (see Chapter 4 section 4.3.1 and 4.3.3) are sufficiently stable to be transferable to other domains. If this is right then perhaps an expert has an idiosyncratic set of skills that he/she will apply to any situation in, or external to, the domain of expertise.

Expert ability is usually developed in a specific domain. Within that domain experts spend ten years or more acquiring domain related knowledge. However, along with that knowledge they develop many skills to enable them to apply their knowledge. Some of those skills will be domain specific, for example the ability to recognise cues, an ability to compare current events with past events, or simply being able to recognise subtle change within the domain. Other skills may not be domain specific and could have application in other domains. Examples of non-domain specific skills could be knowledge of languages, mathematical knowledge, computer skills, and decision-making.

Edwards' (1983) argues that non-domain specific skills are part of what he sees as '*a taxonomy of intellectual tasks*'. These intellectual tasks are part of the expert, that is they are part of the expert's cognitive development. They do not require domain specific information such as cues to enable the expert to use them. A language specialist, who developed his/her expertise in a teaching domain, could be expected to perform well in another domain requiring language skills such as an interpreter. Similarly an expert who has developed exceptional mathematical skills through specialisation in engineering could be expected adapt easily to other domains requiring mathematical skills such as lecturing in maths at a University. Decision-making skill should also be applicable outside of the domain in which it was developed, providing that contextual information on which to base the decision is available to the expert (see Chapter 3, section 3.5.5).

When experts are studied within their domain of expertise they will exhibit all their domain specific skills. Therefore, a study of process away from domain of expertise is appealing because it can consider specific skills (Edwards, 1992) in isolation, to examine and perhaps help in the development of a taxonomy of expert skills that can be generalised across domains. Superior decision-making skill is a characteristic that is frequently used to distinguish experts from non-experts (Simon & Chase, 1987), and as I have mentioned earlier (see Chapter 2, section 2.1.5) this ability to make sound decisions is highly desirable in managerial positions (Bennett & Felton, 1974; Gilmour & Corner, 1998; Lipshitz, 1994; Mintzberg, 1984; Simon, 1987). Therefore, managerial role provides an environment in which the individual difference that determine the expert's

decision-making process can be studied without having to have a detailed understanding of his/ her domain of expertise.

The term managerial role was not intended to do more than define an environment. I did not want to consider specific management tasks for several reasons:

1. By definition the experts are not expert managers.
2. I only wanted to consider situations in which the experts applied aspects of their expertise.
3. I was only interested in expert's decision-making processes, which I believe are not determined by a particular managerial role.

As I have stated earlier, my interest was to consider experts working in a management role and I had identified some indication that personal characteristics determined how the consultant carried out his/her managerial role. As the task to be achieved and the environment were relatively constant, it was apparent that the process used to complete the task, not the task its self, should be the focus of my research.

In summary, I set out to study experts' decision-making independent of task. In a study of experts domain and or task is important but that is not what I wanted to study. My intention was to study decision-making in terms of personal characteristics and individual differences. I chose to study the experts out of their domains of expertise to avoid any suggestions about domain specificity. Nevertheless the experts had to be doing something that would require the use of their expertise, would provide context for their decisions, and allow their expertise to be studied. I chose 'managerial role' because it is an environment that many experts move into, not as experts but frequently because of that expertise. I saw managerial role as something like a controlled environment in which each respondent would be exposed to similar managerial problems.

It is not uncommon for experts to become managers. They often, without additional training, apply their expertise to difficult management tasks and are

seen to be successful, yet apparently no-one has examined domain specific experts working as managers. Auditors (Abdolmohammadi and Shanteau, 1992; Shanteau, 1995), engineers (Hammond *et al.*, 1987), various medical specialists (Patel and Groen, 1991) many other domain specific experts have been studied, but apparently no consideration of experts' managerial decision-making has been reported. Mintzberg (1989), Simon (1978), and many others have examined management decision-making, but not specifically the managerial decision-making of experts.

Could it be that in developing expertise the expert also develops skills that are appropriate for management, or perhaps experts that succeed in management have suitable cognitive or subjective characteristics to be successful in both domains without additional training? It may be that in developing expertise the expert also develops an understanding of decision theory.

Decision-making can be learnt, and is accepted as an important part of both expertise and management (Shanteau, 1988; Simon, 1987). The important constraint is the information about which decisions are made, this could be said to be domain specific. Perhaps some experts are sufficiently versatile to be able to adapt (Patel and Groen, 1991). Furthermore, the 'expert' who is a manager is, in Maccoby's (1987a,b,c) view, a very capable decision maker when logic alone can determine outcomes.

Decision-making is a contextural, or interwoven, aspect of management, as is the management of people to achieve goals. Management of people can be thought of as a personal skill that is acquired concurrently with development of expertise in a particular domain due to a constant interaction with people, but it is probably best thought of as a behavioural ability that is characteristic of the person (Myers and Myers, 1986). There is little evidence in the literature of any consideration of experts as managers, however, a management style defined as 'expert' by Maccoby (1987a,b,c) recognises that expert managers frequently do not have good interpersonal skills. As a large employer of experts in managerial positions, the National Aeronautical and Space Administration (NASA) in The United States of America can provide some interesting insights to the managerial skills of

experts. At NASA it has been found that experts often view problems as technical issues that can be resolved through the application of logic, and consequently are likely to be insensitive and ineffective when involved in the management of social issues (Maccoby, 1987a,b,c).

In many domains, such as psychology, chemistry, or teaching, it is normal for training to include tertiary education followed by the development of practical skills. However, during the period of expertise acquisition management training is not normally included. Nonetheless, experts do frequently and successfully move outside their domain of expertise to take up management positions, but there is little evidence that this occurrence has been studied.

5.4.4 Developing the research question

The literatures relating to experts, decision-making, psychology, and management overlap, as shown in figure 5.1.

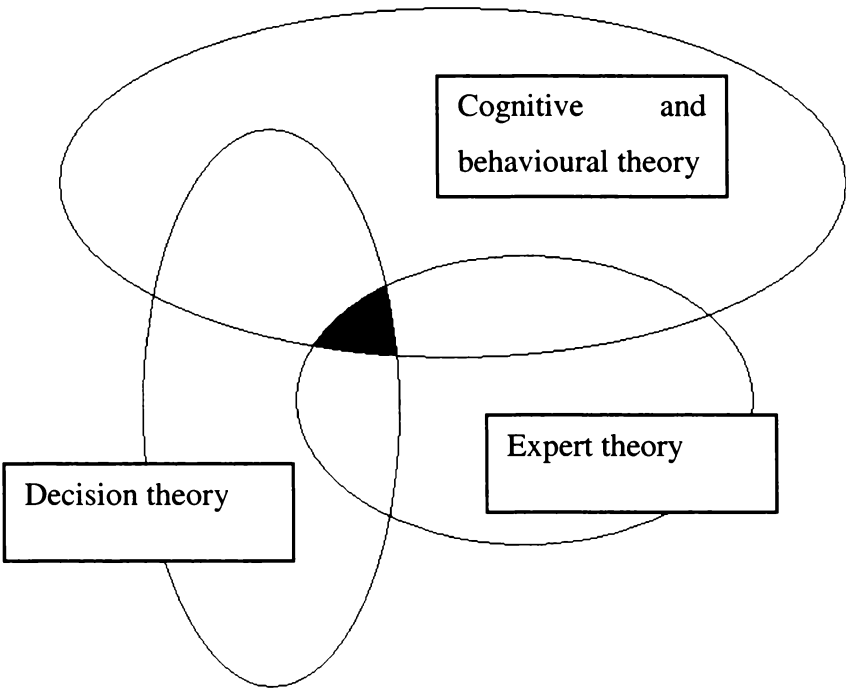


Figure 5.1. Overlapping theories with the lacuna in black.

Within the overlap are located the lacunas discussed in the previous section: subjective variables, subjective characteristics, and cognitive style. I stated earlier, my belief, that the setting in which I examine the lacunas is important, and I have represented the contextual setting, management theory, in the diagram to illustrate that all the identified lacunas can be examined within a managerial context. These issues have apparently received minimal attention in the literature, and I therefore conclude that my research has no precedent.

5.4.5 Research question

In order to improve the understanding of experts my research will seek an answer to the following research question: What shapes the managerial decision-making processes of an expert? My research question is intended to discover new knowledge about the perception and conception of information by experts in their natural working environment, and how it may influence their decision-making processes.

There appear to be three particularly important influences that have the potential to shape an expert's managerial decision-making processes:

1. The expert's personal psychological makeup. Psychological factors can be seen as internal influences that are potentially strong enough to determine experts' actions.
2. The expert's prior training and experience. During the extensive development period of ten years, or more, that it takes to become an expert, a strong reliance on acquired skills develops which may influence expert's managerial decision-making.
3. The management role and associated influences and constraints. This can be seen as external to the expert. Experts may resist the influence of their managerial role, or they may be consumed by it. [Note. Managerial role in this work means the functions carried out by the respondents in their jobs as managers.]

Number one, above, is the primary focus of my research; a consideration of the influence of subjective variables, subjective characteristics, and cognitive style on experts' managerial decision-making.

Within the broad scope of my research question, answers to the following questions will be sought. The questions can be seen as taking specific, defined positions from which to consider the shaping influences that are at work. The questions are not, by design, linear; they are searching. The intent here is to examine all reasonable possibilities, so that the important shaping influences are identified.

Question 1. How does the expert make decisions?

To answer my research question it is first necessary to determine what shape the expert's decision-making processes take. Shape, here means the organised and/or defined form or pattern that the expert's decision-making process appear to follow and, is synonymous with the expert's preferred way of processing decisions, and with the expert's preferred decision-making style. The shape of the expert's decision-making processes is, for the purpose of this research, thought to be a manifestation of the interaction between the individual's subjective characteristics, his/her expertise, and his/her managerial role. Therefore, this first question attempts to identify any examples of pattern formation associated with decision-making processes that are displayed by the respondents who feature in the case studies.

Question 2. How does the expert's preferred decision-making style fit with his/her subjective characteristics?

An answer to this question may establish that there is, or is not, an association between the observed shape of experts' decision-making processes and their subjective characteristics. The subjective characteristics considered here are those recorded in interviews and observation, plus the indications derived from psychological evaluations. If an association is apparent, then this may support the

idea that subjective characteristics do determine the decision-making processes of experts.

Question 3. How do the expert's decision-making processes influence his/her managerial role?

Having determined, in answer to question one, what shape the respondents' decision-making processes take, this question attempts to explain what happens when that shape, in the form of the decision-making processes of expertise are applied to a managerial role. Experts bring to a managerial role personal dispositions that have probably influenced the development of their expertise. Additionally experts, by definition, have had many years to develop a particular pattern of behaviour, which has been recognised as expertise. Therefore, it seems probable that the combination of personal disposition and entrenched expertise will have a strong influence on the experts' decision-making processes in their managerial role. [Note. Managerial role in this work means the functions carried out by the respondents in their jobs as managers.]

Question 4. How does the managerial role influence the expert's decision-making processes?

This question takes an alternative perspective from that of question three. It examines the possibility that the shape of experts' decision-making processes may be affected by the managerial role. There are many strong influences in management that could perhaps, apply sufficient pressure on an expert to cause a change in their decision-making processes. [Note. Managerial role in this work means the functions carried out by the respondents in their jobs as managers.]

Question 5. How does the expert's management role fit with his/her subjective characteristics?

This question attempts to explain how experts' general dispositions, which are displayed in their subjective characteristics, allow them to satisfy the requirements of their managerial role.

5.5 Chapter summary

The preceding chapters have examined the existing literature relating to experts, decision-making (where it is relevant to the study of experts), and psychological factors that may help to explain the cognitive processes of experts in a decision-making situation. In this chapter I have presented a synopsis of the material presented earlier, then drawn from those earlier chapters to establish a link between the topics to show the clear relationship that exists between them. I then identified a lacuna worthy of investigation, and developed a research question to examine that lacuna.

In the following chapter I discuss the background to my constructivist approach to research, and explain the procedures that I adopt to pursue my research question.

CHAPTER 6



Research Procedures

My research, as mentioned earlier in this thesis, examines the managerial decision-making processes of experts. For this research I use a qualitative case study procedure to obtain knowledge relating to the manager's decision-making processes. I set out in this chapter how I went about my research. However, before explaining how I conducted my research, it is appropriate that I state what determines my research perspective, and why I elected to use qualitative procedures. Therefore I begin this chapter by examining how social science research has developed to its current status, and show where my research fits within social theory. Next I state my chosen research procedures, justify my choice, and explain the procedures. Then I explain how I went about satisfying qualitative research criteria for trustworthiness. Finally I make a statement about the delimitations, limitations, and ethical issues that relate to my study.

This chapter is in four parts, section one is a consideration of the philosophy of social science, section two is my justification for the research procedures that I adopted, section three is a report on my research procedures, and section four sets out the research limitations.

6.1 The philosophy of social science research

Until recently most research could be described as positivistic; based on a philosophy that experimental investigation and observation are the only sources of substantial knowledge. Social science is a relatively new discipline, that has adopted some of the procedures developed by the positivistically inclined 'natural' or physical sciences. Of obvious significance is 'scientific' method, which originated in metaphysical debate. Metaphysics is the philosophical study of reality. It considers the principles of being and knowing, and theorises on the nature of things (Burt, 1932). Aristotle wrote on metaphysics, as did Descartes. The development of 'scientific' method is associated with people such as Locke and Hume. The seventeenth century philosopher Locke argued that all knowledge comes from experience not pure thinking. Hume, a Scottish philosopher, began in the eighteenth century, the rational evaluation of cause and effect (Preece, 1994).

Metaphysics is not an empirical science, in fact many of the statements made are not capable of being empirically tested and may be considered to be nonsense by a positivist. Nonetheless, metaphysics has made an important contribution, known as rational thinking, to modern research method (Preece, 1994). In the past unexplained events were often credited to the influence of mystical forces. Now rational thinking can usually equate unexplained events to logical possibilities.

However, the philosopher, Karl Popper, in his book 'The Logic of Scientific Discovery' (1934/1960) put forward his view that knowledge cannot be absolutely confirmed. He suggested that science progresses by disproving current theory, which is then replaced with equally provisional new theory that incorporates more of the known data. The hypothetico-deductive concept on which Popperian theory is based, was widely accepted as the way science progressed until Thomas Kuhn (1962), also a philosopher, published his book 'The Structure of Scientific Revolutions' which caused strong divisions in the philosophical ranks. Kuhn's ideas have overtaken Popperian theory, in particular Kuhn's conceptualisation of a paradigm (Masterman, 1970). Although Kuhn did not see a place for paradigms in the social sciences (Lather, 1990), the paradigm concept has become the foundation material for explanations, and justifications of the many research

perspectives that exist in the social sciences (Deetz, 1996, Guba, 1990). Consequently the next section, of this chapter, looks at the origins of the term ‘paradigm’ in social science, and examines what paradigms mean to the social sciences.

6.1.1 Paradigms

Thomas Kuhn developed the philosophical concept of paradigm for the physical sciences. Kuhn (1962, 1970) apparently used the term ‘paradigm’ in at least 21 different ways, which at the least fails to clearly define its meaning (Masterman, 1970). However, Masterman’s explanation of Kuhn’s work defined three types of paradigm; metaphysical, sociological, and construct. The metaphysical paradigm equates to a set of beliefs, standards, or simply a new way of seeing. The sociological paradigm represents institutionalised achievement, and the construct paradigm encompasses artefacts such as texts and tools.

In an hypothetico-deductive approach to research, induction provides hypotheses which are tested and subsequently confirmed or rejected through the application of deductive reasoning (Preece, 1994). Kuhn’s work is seen to be an advance from an hypothetico-deductive view, which then becomes a problem solving artefact in Kuhn’s terminology, and therefore becomes only one of the possible paradigms (Masterman, 1970). Kuhn’s paradigms can exist before the theory is formed, they are a ‘way of seeing’. Paradigms are a conceptualisation of something, what Masterman calls “*a concrete picture of something*” (p. 77), which can be used analogically to describe something else. This concept has formed the foundation on which others have built (Guba, 1990).

There exists, according to Masterman (1970) three situations, non-paradigm science, dual-paradigm science, and multiple-paradigm science. Non-paradigm science is the inductive or philosophic stage at the beginning of the thinking process before a paradigm exists. Dual-paradigm science exists when an existing paradigm is falling from favour and another is contending as a replacement. Multiple-paradigm exist when there is a discordant development between theory, practice, and technology. Masterman recognised that, in the late sixty’s, the social

sciences were in a discordant situation. Now, thirty years later this discordant situation in social science is perhaps more intensified. The triad appears to have become more divergent. In particular technological development is apparently outstripping development in the other areas. I say apparently in caution because people, particularly researchers, are always unable to move outside the ideas of their time to develop a truly balanced perspective of current events (Burt, 1932/1964). However, it appears that multiple-paradigm science is still the prevailing situation in the social sciences.

The discordant development between theory, practice, and technology creates an environment in which there is constant revision and development of paradigms, and often assimilation or combination. The state of flux requires new paradigms to be created which form sub fields. As these sub fields proliferate, the separation between them becomes more trivial until eventually someone conceives of a new paradigm that encompasses many of the established fields, and gives a more central insight to the nature of the field (Masterman, 1970). It may happen through the collapse of rival, perhaps weaker paradigms, or by assimilating other closely associated paradigms, so that one paradigm prevails and more advanced research can develop. This final stage of paradigm development, where an established paradigm (or paradigms) is replaced is known as a paradigm shift, and is evident in the physical sciences. The social sciences however, are thought to be at an earlier stage of development in which there is no dominant paradigm, consequently paradigm shifts are not experienced (Skrtic, 1990).

From her comprehensive assessment of Kuhn's original work on paradigms, Masterman (1970) provided a clear picture of what is, in her view, a 'paradigm'. Put simply, a paradigm is 'a concrete picture' that is used analogically to perceive a solution to a problem. It, a paradigm, is "*an artefact which can be used as a puzzle-solving device; not a metaphysical world view*" (p. 76). The analogy that a paradigm is a concrete picture is apt, because the boundaries of a paradigm tend to be finite, as is concrete. When paradigms approach their elastic limit they tend to suffer from the 'law' of diminishing returns, but more importantly they can fail. If stretched too far a paradigm can, according to Masterman, produce "*conceptual inconsistencies, absurdity, misexpectation, disorder, complexity and confusion in*

exactly the same way as a crude analogy does" (p. 82), without any possible explanation of what has gone wrong.

Following Kuhn (1962) and the subsequent 'interpretation' of his work by Masterman (1970), the term 'paradigm' became so widely misused that Mintzberg (1978) suggested, somewhat tongue in cheek I think, that any paper submitted for publication that contained the word 'paradigm' be rejected "*out-of-hand*" (p. 636).

Morgan (1979), in response to Mintzberg's comment, set about realigning the term 'paradigm' with Kuhn's work. He adopted Kuhn's concept of paradigms; in particular he adopted the idea of metaphysical, sociological, and construct paradigms. He claims that social scientists operate within a metaphysical paradigm. That is, they operate within a set of beliefs, standards, or a way of seeing, while rarely questioning or examining the context. Instead, social scientists concern themselves with what Kuhn (1962) considered to be less important debates and associated puzzle-solving activities, which Kuhn defined as 'normal science'. Normal science takes place within the sociological paradigm, which represents institutionalised achievement, and the construct paradigm which encompasses artefacts such as texts and tools.

Burrell and Morgan (1979) develop Morgan's comments to propose that all perspectives should be grouped within a framework of four metaphysical paradigms. They suggest that two pairs of dimensions, subjective-objective and sociology of regulation-sociology of radical change, form the four sides of a frame [Figure 6. 2]. Within that frame they identified, 'Radical Humanist', 'Radical Structuralist', 'Interpretive', and 'Functionalist' paradigms.

Although there are many alternate views to those expressed by Burrell and Morgan (See Guba and Lincoln, 1989; Lincoln and Guba, 1985; Van Maanen, 1983 for examples), they appear to be the first to have attempted to draw together all the ingredients of social science research in an attempt to form a coherent body of understanding. Therefore I propose follow the four-paradigm model produced by Burrell and Morgan [figure 6.2] to describe in outline the key assumptions made by social scientists.

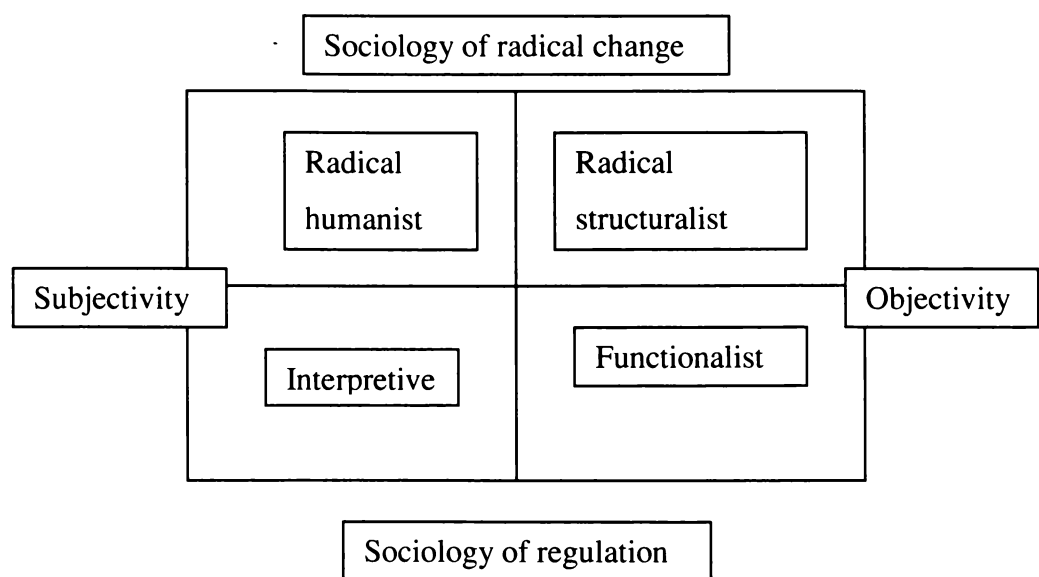


Figure 6.2. The four paradigms for the analysis of social theory proposed by Burrell and Morgan (1979).

The first dimension, subjective-objective, forms the horizontal axis of the Burrell and Morgan model and establishes four kinds of assumptions that are made by social scientists.

1. Ontological assumptions about reality. Such as whether reality is external to the individual or the product of the individuals mind.
2. Epistemological assumptions about what can be known, what is the relationship between the inquirer and the known or knowable.
3. Assumptions about human nature such as are people conditioned by their environment, or do they have free will to control their environment.
4. Methodological assumptions about how the inquirer should go about finding knowledge.

Each of the above assumptions has application across the subjective-objective dimension as set out below.

- Ontology ranges from objective realism where a real world of tangible objects exists to a subjective nominalism where nothing but names exist outside the person.
- Epistemology ranges from objective positivism based on the traditional scientific approach associated with the natural sciences to subjective anti-positivism which holds that is relativistic and can only be understood from the perspective of the individuals involved.
- Human nature ranges from objective determinism where human activity is seen to be a response to environmental influences to subjective voluntarism where humans are autonomous and free-willed.
- Methodological assumptions range from objective nomothetic protocols and techniques to subjective ideographic consideration of the individual.

The extreme positions of the four assumptions, according to Burrell and Morgan, represent 'social positivism' and 'German idealism', two major intellectual positions that have dominated social science for more than two centuries. In recent times, particularly the last twenty years, intermediate positions have arisen and there is now a range of positions between the two extremes.

The second dimension identified by Burrell and Morgan is at one extreme the sociology of radical change, and at the other the sociology of regulation.

- Sociology of radical change is concerned with deep-seated structural conflict, conflict, and domination that some see as characteristic of modern society.
- Sociology of regulation is concerned with social cohesion and solidarity and the reasons why society remains as an entity.

Burrell and Morgan maintain that the two perspectives are necessarily separate and distinct from each other, so that there is essentially no middle ground. They claim that these are alternative models that require a researcher to commit to one

side more than the other. Some of the dimensions identified by Burrell and Morgan are status quo or radical change, social order or conflict, and solidarity or emancipation; for each pair there is no middle ground, a choice for one effectively eliminates the alternative from consideration.

Having separated the model along a horizontal axis based on assumptions about the nature of science, the subjective-objective dimension, and a vertical axis based on assumptions about the nature of society in terms of regulation or radical change, there are now four quadrants. These quadrants, according Burrell and Morgan, represent four paradigms that sanction the meta-theoretical assumptions that drive the social theorists that operate within them. The upper pair are named 'radical humanist' and 'radical structuralist', and the lower pair are 'interpretive' and 'functionalist'. Before explaining these paradigms it is useful to consider what these paradigms represent.

The paradigms delimit radically divergent perspectives for the analysis of social phenomena. They are analogous to Kuhn's metaphysical paradigms, and accommodate Kuhn's sociological and construct paradigms (Kuhn, 1962; 1970bc). Each of Burrell and Morgan's paradigms identifies a totally separate social-scientific reality, and Burrell and Morgan claim that the meta-theoretical assumptions of all social theorists will place them within the context of these paradigms. Inside each paradigm 'normal science' as defined by Kuhn (1962) takes place, and there may be considerable debate between theorists, but seems to be extremely rare for inter-paradigm activity to occur. Burrell and Morgan suggest that a theorist changing from one of their paradigms to another is "*in Keeping with Kuhn's (1970) notion of revolutionary science*" (p. 24). However, I believe that Kuhn was referring to conceptualising new paradigms through an amalgamation of new and existing ideas (Kuhn, 1962; Masterman, 1970); the new paradigm then replaces the old, as with the Copernican system, or Einstein's theory of relativity. Nonetheless, Burrell and Morgan's paradigms do appear to bring together many divergent ideas into a coherent whole.

As with the sociology of regulation and sociology of radical change mentioned earlier, Burrell and Morgan's four paradigms are very different ways of seeing

things, which in their pure form are based on opposing meta-theoretical assumptions. An acceptance of one set of assumptions defies acceptance of the others as can be seen in the paradigm descriptions that follow.

Radical humanist takes a subjectivist perspective of the sociology of radical change. This paradigm is concerned with analysis of the *status quo* with a view to changing it. Its origins lie in the German idealist tradition of Kant, Hegel, as interpreted in the early works of Marx who sought to change the world through changes in societal awareness and thinking.

Radical structuralist takes an objectivist perspective of the sociology of radical change. This paradigm is concerned with social forces, internal contradictions, and power relationships. Its main origin is the later work of Marx who had become interested in theories of evolution and in political economy.

Interpretive takes a subjective perspective of the sociology of regulation. This paradigm sees the world as an emergent social process created by individuals. It is concerned with understanding the basic nature of the usual world, the status quo with a view to understanding and explaining it. Its approach to social science is anti-positivist and ideographic such that social reality rests with the consciousness of the individual, and anything else is merely assumption and subjectively shared meaning. This paradigm is the direct product of the German idealist tradition of social thought established by Kant.

Functionalist takes an objectivist perspective of the sociology of regulation. This paradigm concentrates on understanding order, equilibrium, and stability in society and how they can be maintained. It is the 'positivist' paradigm, which attempts to apply the ideas and methods of the natural sciences to the study of peoples' affairs. This, according to Burrell and Morgan, is the paradigm, which forms the meta-theoretical base for most organisational theorists, psychologists, industrial sociologists, and industrial relations theorists.

There is now a well-established movement away from the strictly positivist perspective which Burrell and Morgan identified as the norm, towards what they

called a phenomenological perspective. Phenomenology was identified, in the Burrell and Morgan model, as a dominant research form in the interpretivist paradigm, but the paradigm had not at that time provided much organisation theory. The term phenomenology is now widely used as an umbrella term for all kinds of qualitative research (Easterby-Smith, 1991), although it is also the description of conscious experience founded by the German philosopher Husserl.

6.1.2 Subjective-objective problem

The Burrell and Morgan model is distinctly divided between subjective and objective assumptions. This, as Deetz (1996) has stated, is no longer acceptable. Contemporary researchers recognise at least three problems with the dichotomy. First, the meaning of subjective-objective does not have generally accepted meaning. Different cultures, different societies within those cultures, and researchers who assume different research perspectives within those societies all attach different meaning to the terms 'subjective' and 'objective'. Second, the subjective-objective label forms an artificial division between researchers that provides identity and status for some, and causes others to be obscured. Nonetheless, a growing acceptance that the difference between objective and subjective is rhetorical not substantive has led to the establishment of new research perspectives. Deetz claims that many feminists, postmodernists, poststructuralists, critical theorists, and labour process theorists have been inspired by the writings of the European philosophers Husserl, Heidegger, and Wittgenstein. These writers suggest that language not consciousness determines our understanding. Therefore, the new research positions cannot, and should not be classified as either subjective or objective; they are a new dimension. Thirdly, the subjective-objective has become, to some researchers, synonymous with qualitative-quantitative. The subjective-qualitative association is seen by some to reduce this type of research to "*impressionistic musing*" (p194) (Deetz, 1996). Others see it as an alternate form of data collection to the one they see as an objective-quantitative method, and use both for what they think to be an aid to triangulation.

Deetz (1996) replaces the axis of the Burrell and Morgan (1979) model with what he considers to be “*a more contemporary look at alternative research programs*” (p195). He defines two contrasting dimensions, ‘local/emergent-elite/a priori’, to replace Burrell and Morgan’s ‘subjective-objective’ dimension, and ‘consensus-dissensus’ to replace Burrell and Morgan’s ‘social regulation-social change’.

The first dimension accounts for the overall research process by identifying the origins of concepts and problems statements. As the title suggest, local/emergent represents concepts and problem statements developed with the research and elite/a priori represents those brought to the research. Three benefits are gained from this new dichotomy. First, it recognises social constructions and identifies the conceptual origins of objects and problems. Second, this focus helps to separate elite/a priori, theoretical ‘book’ knowledge or knowing about, from local/emergent, ‘practical’ knowledge or know how. Thirdly, it helps to identify bias.

The second dimension, ‘consensus-dissensus’, represents at one extreme unity or continuation of existing discourse, ‘consensus’, and at the other extreme difference or disruption of existing discourse, ‘dissensus’. Deetz considered that Burrell and Morgan’s model assumed an existence of coherent and cohesive groups that changed through class conflict. The Deetz view sees that conflict exists inside the groups which are not necessarily cohesive or coherent. Problems are, according to Deetz, caused by suppression of human needs, and destructive control processes.

Moving on from Burrell and Morgan’s model, and the refinements that Deetz has proposed, there are many alternate views, or paradigms, which are used to explain research perspectives (Berg, 1995; Morgan and Smircich, 1980; Van Maanen *et al*, 1982. 1983;). Lincoln and Guba (1985) defined the ‘naturalistic’ or constructivist, paradigm as the logical successor to positivism. The constructivist paradigm is in effect used by Lincoln and Guba as an umbrella term for many post-positive points of view, in a similar way to the Burrell and Morgan’s use of phenomenology mentioned earlier.

The 'constructivist paradigm' seems to be another way of conceptualising Burrell and Morgan's subjective, sociology of regulation paradigm; the interpretive view. Lincoln and Guba name postpositivistic, phenomenology, ethnographic, subjective, case study, qualitative, hermeneutic, and humanistic as examples of alternate titles that are frequently applied to the constructivist paradigm. In addition, Guba (1990) identifies postpositivism, critical theory, and constructivism as three major paradigms that reject positivism. Also Deetz (1996), as mentioned earlier, identified the new research perspectives of feminists, postmodernists, poststructuralists, critical theorists, and labour process theorists. Postpositivism is what Burrell and Morgan called the functionalist paradigm. Critical theory developed from the metaphysical basis of the radical humanist paradigm, and constructivism is an alternate title for the interpretivist paradigm (Skrtic, 1990). Feminist theory and labour process theory draw their metaphysical inspiration from what Burrell and Morgan called the 'German idealism'. Feminist theories fit the radical humanist paradigm. Labour process theory could be either radical humanist or radical structuralism, depending on whether it follows the early, humanist, Marxist theory or the later, structuralist, Marxist theory.

The critical issue here is that there has evidently been a persuasive move away from sociological positivism, what Burrell and Morgan call the objective, radical structuralist and functionalist paradigms. Phillips (1990) claims that positivism was in its death throes by 1956, this suggests that the move away had gained considerable momentum by that time. Developments in social science theory have mainly built on German idealism, in what Burrell and Morgan called the subjective, radical humanist and interpretivist paradigms. Burrell and Morgan acknowledged that there were important changes in research focus through the 60's and 70's. In particular they saw a declining interest in the regulation-radical change dimension, and increased interest in the subjective-objective dimension. As I have mentioned earlier, Deetz (1996) criticised the excessive interest in the subjective-objective dimension. His view is that the subjective-objective is no longer appropriate, and has become an obstacle to further progress in social science theory, consequently he proposed two new paradigm dimensions, which may permit a better understanding of the relationship that exists between existing and emergent theories.

6.1.3 Qualitative-quantitative

There are now so many perspectives within the postpositivistic paradigms that the perhaps less emotive, but more descriptive, term ‘qualitative’ has been adopted as a recent umbrella title for the paradigms (Creswell, 1994; Guba and Lincoln, 1998; Easterby-Smith *et al.*, 1991; Leedy, 1993).

Many authors now accept a qualitative-quantitative dimension as the only major distinction between paradigms in social science. The quantitative paradigm builds on the traditional, realist, positivist, experimental, empiricist theories. The qualitative paradigm attempts to accommodate all the theories that are ideologically removed from positivism, and it can be argued that the modern scientific paradigm is postpositivistic (Firestone, 1990). Schwandt (1990) suggests that no matter how many paradigms, theories, research perspectives, or ontologies there may be, there are only three paths to enquiry within the social sciences: scientific methodologies, constructivist methodologies, and critical science methodologies. Scientific methodologies are those of the quantitative paradigm mentioned earlier. Constructivism and critical science are the methodologies of the qualitative paradigm. Constructivist methodologies derive from hermeneutic enquiry; the study and interpretation of human behaviour and social institutions, and is concerned with “*capturing the lived experience of participants*” (Schwandt, 1990, p. 268). Critical science brings together scientific and constructivist methodologies to examine the empirical and interpretive explanations from its own critical dialectical perspective. This is the methodology used by feminism and critical theory, among others. It systematically investigates “*the manner in which that lived experience may be distorted by false consciousness and ideology*” (p. 268) (Schwandt, 1990). Simply put, constructivist methodologies search for the meaning of human experience; critical science methodologies attempt to overcome the illusions in human experience.

6.1.4 Postmodernism

Although many authors include postmodernism as part of the qualitative paradigm, others do not (Skrtic, 1990). Postmodernism to Skrtic, and others, is a

movement beyond the four-paradigm model of social science to a position which is disbelieving of all social science paradigms. However, as I do not wish to enter the postmodernist debate, I confine myself to the contents of the qualitative umbrella as stated above, and now present an overview of the ideology of what has become known as qualitative research.

6.1.5 Qualitative and quantitative assumptions

Postpositivism is seen as a reaction to the perceived failings of a positivistic approach. Most of the features of postpositivism have come from the 'hard sciences', physics and chemistry, although the arguments put forward in the hard sciences are even more persuasive when applied to the study of people (Hanson, 1958; Phillips, 1990). Qualitative research is founded on postpositivism. Postpositivism in its many forms, as mentioned earlier, is the resultant reaction to dissatisfaction with positivistic ideologies, and is generically known as the qualitative paradigm. Positivism was the path of the natural sciences, but it has not escaped the postpositivistic developments, which it spawned. Positivism in its contemporary form accepts some of the postpositivistic ideas that can be applied to quantitative procedures, and in its contemporary form is known as the quantitative paradigm.

The quantitative paradigm is based on at least five assumptions. The qualitative paradigm makes five very different assumptions (Guba and Lincoln, 1989; Lincoln and Guba, 1985). Both sets of assumptions are set out below.

1. Ontological assumptions

Quantitative. An ontological assumption that there is a single, tangible reality able to be studied by evaluating its components independently since the whole is merely the sum of its parts.

Qualitative. An ontological assumption that there are multiple constructed realities that can only be studied holistically, and that enquiry into these realities will inevitably diverge so that prediction and control are unlikely, but some level of understanding may be achieved.

2. Epistemological assumptions

Quantitative. An epistemological assumption that allows separation of the observer from the observed.

Qualitative. An epistemological assumption that the observer and the observed interact to influence each other, such that the knower and the known are inseparable.

3. Time and context assumptions

Quantitative. An assumption that time and context are independent of observation such that what is true for a sample at one time and place may also be true for a similar sample at another time and place. With an intent to form generalisations that hold anywhere at any time. A nomothetic perception.

Qualitative. An assumption that an enquiry will develop a specific knowledge that describes an individual case. An idiographic perception.

4. Cause and effect assumptions

Quantitative. An assumption that cause and effect are inseparable.

Qualitative. An assumption that all things are in a state of mutual simultaneous shaping such that it is not possible to differentiate between causes and effects.

5. Value ladenness assumption

Quantitative. An assumption that the enquiry is value free. The objective methodology ensures that the results of an enquiry are fundamentally free from bias introduced by external values.

Qualitative. An assumption that all enquiry is value laden. Research is influenced by:

- (1) The enquirers values, choice of problem and framing of the problem.
- (2) The enquirers choice of paradigm that guides the enquiry.
- (3) The enquiry is influenced by the essential theory used to guide the collection, and interpretation of information.
- (4) The enquiry is influenced by contextual values.

- (5) There must be value-resonance (congruence) between problem, paradigm, theory, and context for the enquiry to produce meaningful results.

From the qualitative assumptions mentioned above comes a set of interrelated implications for qualitative research (Guba and Lincoln, 1989; Lincoln and Guba, 1985).

- The ontological assumption requires the study to be in a natural setting; otherwise known as in context.
- The adaptability necessary to cope with the variety of realities requires that the primary data-gathering instrument must be a person. All instruments interact with respondents, but the human instrument is capable, to some extent, of grasping and evaluating meaning associated with the interaction.
- Intuitive as well as formal knowledge is required. Much of the interaction between the enquirer and the respondent of enquiry occur at an intuitive level, which reflects most honestly, and accurately the values of the enquirer.
- Procedures (methods in positivist rhetoric) will necessarily be descriptive (qualitative procedures) rather than empirical probability (quantitative methods). Quantitative methods have a place in qualitative procedures, a supporting role, but the many mutually shaping influences and value patterns that may be encountered are more sensitive and adaptable to qualitative procedures.
- Sampling is purposive; it seeks out particular instances thereby exposing a greater range of data. It may expose several possibly realities. In this way the enquirer can attempt to account for contextual items such as local conditions, local influences, and local values. By contrast, the random

sampling of quantitative methods tends towards the norm, and may suppress deviant cases.

- Inductive analysis is most appropriate. It allows values to be an explicit part of the analytic structure and, more than deductive analysis, it allows the enquire-respondent interaction to be explicit, and the interaction of the mutually shaping influences are more likely to be identified.
- Theory that existed before the investigation (a priori) is based on prior generalisations which may not fit the particular situation being examined. Therefore, it is preferred that the theory should emerge from the data (grounded theory) because no previously existing theory could possibly include the multiple realities that are likely to be encountered.
- Research tends to follow a path of emergent design as the enquiry proceeds, because what emerges from the enquirer-respondent interaction is largely unpredictable before the event. Additionally, the enquirer cannot know the form of mutual shaping that may occur, nor how the value systems, including the enquirers, will interact.
- The enquiry depends on the nature and quality of the interaction between the enquirer and the respondent. It is the respondent's constructions of reality that the enquirer seeks to represent, and the respondent is the best person to authenticate the enquirer's conceptualisation of events. Therefore, outcomes are negotiated.
- Reporting should take the case study form which is most suited to the description of multiple realities; it is adaptable, able to demonstrate the variety of mutually shaping influences. It can also best represent the value positions of the enquirer, existing theory, procedures, and particular contextual values. The case study report allows the reader to build on his or her own intuitive knowledge and understanding, and also enables personal generalisations to be made.

- Idiographic representation is the norm because the validity of interpretations relies heavily on the enquirer-respondent interaction, contextual factors, local mutually shaping influences, and values including those of the enquirer.
- Generalisations, if made, are provisional, hesitant, and cautious because the findings are bound up in the particular interaction between the enquirer and the respondent. Also, the findings are context and value dependent, and the mutually shaping influences may be very different in another setting.
- Enquiry boundaries emerge as the problem comes into focus. Without prior knowledge, which is not available to the enquirer, contextual and mutually shaping influences boundaries cannot be set.
- Decisions about the trustworthiness of qualitative procedures cannot be based on existing quantitative criteria. Quantitative research relies on internal and external validity, reliability, and objectivity to establish the trustworthiness. Internal validity establishes that what is intended to be measured is measured. External validity is established when the results are found to be generalisable to a larger population, a different group, or a different setting. Reliability establishes that when the measure, test, or experiment is repeated a similar result will be obtained. Special criteria for trustworthiness adopted for qualitative research are examined after the following brief explanation of why the quantitative criteria fail in qualitative research.
- Internal validity fails because it depends on a one to one correspondence (isomorphism), which is not possible with multiple realities. External validity fails because it is incompatible with the inability to generalise with certainty. Reliability fails because emergent design denies unconditional replicability. Objectivity is in direct contravention of the

enquirer-respondent interaction, and the recognition of the importance of values and context.

- Alternate special criteria for trustworthiness, known as credibility, transferability, dependability, and confirmability, need to be used [see also Cassell and Symon, 1994; Easterby-Smith *et al.*, 1991; Miles and Huberman, 1984].

6.1.6 Postpositivist trustworthiness criteria

Lincoln and Guba (1985) devote forty-one pages to 'Establishing Trustworthiness', in their treatment of credibility, transferability, dependability, and confirmability. As they state, it is on the issue of trustworthiness that qualitative research is most frequently questioned, and it is therefore essential that acceptable criteria be put forward and defended. This thesis can only briefly cover the topic. However, in the remainder of this sub section I examine the essential meaning of the terms as they relate to research within limits of the qualitative paradigm set out earlier.

Credibility

Five techniques are proposed to ensure credibility.

1. There are three specific activities, which increase the possibility of credible findings being produced. (a) Prolonged engagement. The investment of sufficient time to learn the 'culture', test for misinformation introduced by distortion, and build trust, but not so much time that the researcher becomes part of what is being researched. When the researcher loses an association with his or her origins and 'goes native' there is a tendency to lose the research perspective by changing from being an observer, to become a contributor to the research with a 'performance understanding'. (b) Persistent observation. During a prolonged engagement persistent observation attempts to identify characteristics relevant to the research problem and to focus on them in detail. To satisfy the trustworthiness criteria the enquirer must be able to describe in detail how identification and exploration was carried out. Persistent observation requires that the enquirer retain a degree of

scepticism, to avoid focusing too soon, before an appropriate recognition of context, values, and mutually shaping influences is achieved. (c) Triangulation. At least four modes of triangulation exist. They require the use of either multiple and different sources, methods, investigators, or theories, or any combination of them. Triangulation is a well-established technique for locating, measuring, or observing a point of interest by taking several, at least two, different perspectives which allow corroboration or contradiction of data. [See Denzin (1978), and Fielding and Fielding (1986) for detailed coverage of the topic]

2. Peer debriefing. This requires the enquirer to explain his/her work to a person who understands the research paradigm but is not involved in the specific research. The peer effectively follows the devil's advocate line of enquiry to attack the enquirer's work, if possible to destruction. If the enquirer is able to defend the work it then has some credibility.

3. Negative case analysis. This process, originally proposed by Kidder (1981), is claimed to be analogous to statistical tests for quantitative data. Negative case analysis is said to be a process of revising assumptions with hindsight to achieve a hypothesis that, without exception, accounts for all known cases.

4. Referential adequacy. Data, however recorded may be kept in its original form for later comparison and evaluation. Sceptics are then able to use these materials to satisfy themselves that the findings and interpretations are meaningful by testing them against the raw data. Being able to support the findings in this way is extremely compelling (Lincoln and Guba, 1985). This simple process appears to be the best possible defence a qualitative researcher can provide, assuming items 1, 2,3, and 5 have been properly observed such that the research has credibility to defend.

5. Member checks. For the enquirer to be able to report that his/her findings are representative of the respondent(s), the respondent(s) must be able to react and provide feedback. A summary of an interview could be discussed with the person interviewed, or other people may be asked to express their opinions on information obtained. This is an integral part of the research process and is

somewhat similar to triangulation. In both processes the enquirer seeks alternate perspectives to either confirm or contradict the enquirer's perception of respondent. This is a guiding principle in qualitative research.

Transferability

In qualitative enquiry, transferability refers to findings being appropriate in more than one enquiry. Qualitative enquiry is intended to provide, as much as is possible, a complete and detailed description of the enquiry to enable other subsequent enquirers to make decisions about possible transferability. It is the enquirer's responsibility to provide a database on which transferability decisions can be made. The enquirer is not expected to demonstrate transferability. In practice achieving transferability is a complex occurrence because qualitative hypotheses are relevant for the particular time and context that existed during the enquiry. The hypotheses may not hold at some other time or in some other context.

Dependability and Confirmability

These two measures of trustworthiness are possibly the easiest but by far the most time consuming to achieve. The most appropriate method, according to Lincoln and Guba (1985), is to perform an enquiry audit. The auditor must examine the process of the enquiry to establish that it is internally coherent and that appropriate data exists to support the enquiry. There are established procedures for auditing qualitative research. However, because of the auditor will necessarily be familiar with the type of enquiry, it is probable that the audit will be in effect a peer review. In practice it appears unlikely that a disinterested person is likely to be available to perform an audit, therefore demonstrated dependability and confirmability must rest with the enquirer(s).

6.1.7 Researcher effects

Two types of researcher effect need to be considered (Miles and Huberman, 1984): First the influence of the enquirer on the respondent(s), and second the influence of the respondent(s) on the enquirer. In quantitative studies, the first effect, that on the researcher on laboratory experiments, is well recognised. In

qualitative research the first kind of researcher effect is reduced to a large extent by the need for the enquirer to be in contact with the respondent(s) for a lengthy period of time to collect sufficient data. This prolonged engagement (Lincoln and Guba, 1985) allows the enquirer and the respondent(s) to become reasonably at ease with one another, so that the respondent(s) will tend to act 'normally'. The second researcher effect can exist when the enquirer becomes part of what is being researched. If the researcher develops sympathy for or identification with the respondent(s), then the researcher may lose the 'enquirer' perspective (Berg, 1995). Both kinds of researcher bias are part of normal human interaction and the researcher must be aware of them and consider their effects at all stages of the research. The trustworthiness criteria for qualitative research, mentioned earlier, are an important safeguard against researcher effects.

6.1.8 Qualitative emphasis

The emphasis of the literature review presented above has been on the postpositivist, or qualitative approach to social science enquiry. The reason for this is that although there appears to be a strong movement toward qualitative research, the procedures used for qualitative research are less well understood than those of quantitative research (Dachler, 1997). However, it should also be noted that qualitative research requires better identification of objectives during the research design phase, takes much longer to complete and cannot be evaluated by a computer program. It is therefore considered by some researchers to be a more difficult form of enquiry than quantitative research (Berg, 1995). Naturally, a quantitative approach is still possible, as is a combination of quantitative methods and qualitative procedures (Cassel and Symon, 1994; Creswell, 1994; Firestone, 1990).

6.1.9 Scientific method

Earlier in this chapter I stated that scientific method and rational thinking have their origins in metaphysical thought. However, although modern scientific method is based on rational thought, researchers rarely go through a metaphysical evaluation of the nature of being before beginning their study. They do, however,

make paradigmatic assumptions, which determine what they think rationally about. For example, a positivist assumes that the world is real, and that by appropriate rational thinking he/she can discover more real things. These assumptions mean that theories cannot be proved right; they are dependent on earlier presuppositions external to the theory itself. For this reason, an essential principle of positivistic scientific research is that all assumptions must be recognised and acknowledged (Eysenck, 1995).

In contrast a constructivist views consideration of a real world as pointless, and therefore concentrates on learning about individual's interpretations of what happens in specific settings (Lincoln and Guba, 1985). Constructivists accept assumptions as part of a natural bias present in any research. Their existence must be acknowledged, but it may not be possible to recognise them.

Social science, as explained through Burrell and Morgan's (1979) model, and by Lincoln and Guba (1985), has the appearance of a set of mutually exclusive research perspectives that determine and constrain research strategy. In practice this is not the case (Firestone, 1990). Although a researcher may have a predisposition for a particular research perspective, most, if not all researchers are obliged on occasion to use alternate research strategies, if only for the purpose of triangulation. Consequently, there is now such an intermixing of research strategies that the only remaining demarcation is between quantitative and qualitative paradigms and associated methods (Creswell, 1994).

6.1.10 Section summary

To this point, I have examined Kuhn's (1962) conceptualisation of paradigms and, using Burrell and Morgan's (1979) model, I explored the idea of paradigms further, before considering Lincoln and Guba's (1985) explanation of postpositivism, which included a comparison of the positivist-postpositivist assumptions. While considering paradigms and postpositivism, I also examined ontological, epistemological, and methodological assumptions and their impact on sociological enquiry, including the requirement for special criteria for establishing trustworthiness, and researcher effects.

This concludes Section One. In the next section, as a justification for the research procedures that I have followed in my research, I state where my ontological and epistemological background place me within the social sciences.

6.2 Justification for the research procedure

The focus of this study is my research question - ‘What shapes the managerial decision-making processes of experts’.

As I explain in more detail later in this chapter, I consider that to examine my research question the most suitable research procedure is a case study. One case, while it may be interesting, will probably not prove to be a sufficient examination of my research question; therefore I intend to undertake several independent studies, which together will form a multiple-case study. This procedure allows, what Yin (1994) calls a “*literal replication*” (p.109). The first case will attempt to identify and describe how expertise, managerial role, and personal psychological makeup coexist. The subsequent cases will, through replication of the first study, seek additional information, and attempt to identify persistent patterns and/or hierarchies.

6.2.1 Research perspective

The enquiry that I undertake to answer my research question is directed by my research perspective, which is shaped by business management doctrines and psychology principles. Therefore, the genesis of my study is rooted in the social sciences. As with most researchers (Easterby-Smith *et al.*, 1991), my formative years included a predominantly quantitative education. It was dominantly concerned with the measurement, quantification, and unquestioning acceptance of ‘facts’. Again, like many researchers I have come to question many of those facts and now hold a strong belief that enquiry into the activity of people is not a simple numbers game to be evaluated statistically, but requires that any enquiry accounts

for the enquirer's perspective, and the context of the enquiry. Unlike the traditional psychologist's approach, which tries to isolate events, often in a laboratory setting (Ericsson and Smith, 1991), I believe that a true understanding of peoples' actions can only be found in a natural setting (Klein *et al.*, 1993; Lincoln and Guba, 1985). There is ample evidence to suggest that the synergy, which appears to take place in the context of a natural setting, cannot be duplicated in isolation (Ebbesen and Konečni, 1975). Therefore, looking back at Burrell and Morgan's model, which I discussed earlier in this chapter, I see myself as dominantly a subjectivist, although due to my education I clearly can relate to the objectivist position. Therefore I see myself as slightly left of centre on the subjective-objective continuum. On the other axis my research position is dictated by my interest in what is happening and why, the status quo, which places my enquiry in sociology of regulation. Consequently my research perspective, within the Burrell and Morgan model, is best described by the 'interpretive' paradigm.

Within the interpretive paradigm there are many kinds of enquiry. From them, case studies appear to be best suited to my research. I will examine the nature of case studies later, but first I explain why I chose a case study procedure.

Ebbesen and Konečni (1975), and many others have clearly demonstrated a requirement to study experts operating within their domain of expertise. In Ebbesen and Konečni's study, court judges were found to be dependent on environmental cues when assessing bail. Away from their usual courtroom setting judges reached different conclusions from those reached in court, despite having identical information presented to them. Therefore, Ebbesen and Konečni concluded, the judge's decision-making was dependent on the environmental setting. The court judges attached value to information presented to them, by assessing the people who presented the information and how they presented the information. This is a clear indication that it is necessary to consider personal values and context when attempting to understand the actions of experts. Subsequent to the work by Ebbesen and Konečni, researchers have developed a strong awareness that, in most instances, a true representation of the nature of expertise requires that experts be observed in a natural setting (Klein *et al.*, 1993; Olsen and Biolsi, 1991).

Ericsson (1997) contends that experts can be examined under controlled conditions in a laboratory, and for some experts this may be possible. Ericsson has a particular interest in the performance of musicians. It is feasible that some experts, such as musicians, pathologists, and chess players could display their expertise in controlled laboratory conditions. It is argued that this particular kind of expertise may not be as domain specific as other forms of expertise and therefore not as dependent on a particular environmental setting. Against this, as a qualitative researcher, I argue that all performance is contextual and has value to the performer. An expert pianist may 'rise to the occasion' for a concert performance, and surely even a chess grand master builds up some nervous tension for a major tournament. Despite Ericsson's claims, experts who as part of their function manage people and things in a particular environment can be expected to be dependent on environmental cues, in a similar manner to that of the court judges mentioned earlier.

Qualitative research procedures permit observation of experts working in their domain of expertise (Dachler, 1997). There are numerous approaches possible based on different ontological and epistemological assumptions (Morgan and Smircich, 1980). Phenomenology, ethnography, action research and case study are commonly used (Creswell, 1994). Phenomenology is the method founded by the philosopher Husserl. It concentrates on the detailed description of conscious experience, without appeal to explanation. Ethnography is a branch of anthropology that deals with the description of individual human societies. My background in management and psychology has not prepared me for phenomenological or ethnographic studies.

Action research is used in management research, particularly organisation development (Easterby-Smith *et al.*, 1991). The action research approach to the study of management is, according to Easterby-Smith *et al.*, (1991) based on the premise that an understanding of something can be obtained by attempting to change it. They state that action researchers' believe that change is part of the research process and should be incorporated in the research process. With action research, the researcher is at risk of forming a perspective that is similar to an ethnographer 'going native'. He/she is not just an observer, he/she develops a

‘performance understanding’ and becomes a contributor to the research and may therefore lose the original ‘enquirer’ perspective (Guba and Lincoln, 1989; Lincoln and Guba, 1985; Miles and Huberman, 1984).

Action research appears to be aligned with what Burrell and Morgan (1979) called the sociology of change, not the sociology of regulation that I am concerned with. An action research approach requires me to interact with, and therefore cause changes within the setting. I do not want to cause changes. I am interested in how the combination of managerial decision-making and expertise are displayed in a natural setting, when devoid of abnormal influences, such as researchers. Therefore, action research is not an appropriate procedure for my research.

Case study procedures are widely used in the social sciences (Berg, 1995; Creswell, 1994; Guba and Lincoln, 1989; Lincoln and Guba, 1985; McKenzie *et al.*, 1997; Yin, 1994). This includes extensive use in management research (Easterby-Smith *et al.*, 1991; Mintzberg, 1983), and in psychology (Bromley, 1977; Shaughnessy and Zechmeister, 1997). As I explain below, I believe case study procedures are the most appropriate for my research.

6.2.2 Case study

There are many ways to conduct research; experiments, surveys, field studies, action research, and case studies for example. The chosen method is largely determined by the research question(s). These are the who, what, where, how, and why questions. For my research I am interested in the explanatory how and why questions. How does the expert process the information that is available for decision-making, and why do they process it as they do. Answers to these questions can be sort through experiment, histories, case studies (Yin, 1994), but histories are not appropriate for my contemporary research.

To answer my research question – what shapes the managerial decision-making processes of experts – there are three important conditions that need to be satisfied, and as I explain below a case study is the only method that satisfies these conditions.

1. The respondent must be in a naturalistic setting (see Chapter 3, section 3.5.5) so that they can identify cues (see Chapter 2, 2.4.8). A case study could do this, but an experiment cannot.
2. There must be clearly identified context to give meaning to the expert's decision-making (see Chapter 3, 3.5.5). An experiment or a case study could do this.
3. The respondents must not be controlled or unduly influenced by my presence. A case study can do this, but an experiment cannot.

As Yin (1994) states, perhaps the most important reason for using a cases study is the ability to deal with a large variety of evidence, such as interviews, observations, and documentation. So in addition to satisfying the conditions set out above, the flexibility of a case method will allow me to use several different lines of enquiry to develop rich information through a triangulation approach to understanding the respondents individual characteristics, and no other methodology will do this. I need to develop the best possible understanding of the respondent's mental approach to decision-making through interviews, observation and psychometric testing. Also, I want to be able to carry out analytic generalization to be able relate to existing theory and attempt to build new theory, once again only a case study will enable me do this.

Much of the literature that considers experts comes from case studies, and is considered to be the most appropriate and rewarding methodology for developing detailed knowledge of experts (Shanteau, 2001, personal communication). Only case studies can explain, describe, and / or explore the real life causal links in events that I intend to study. I want to describe events and the real life context in which they happen, I also want to explore events with no clear outcome, such as decision processes, and a case study approach is the only way to do this (Denzin & Lincoln, 1998; Yin, 1994).

As I have stated above, case studies can use multiple sources of evidence to enable the collection of rich information, so a case study method is the most appropriate for my research. However, it is possible to have a single case study or multiple case studies. A single case study is most appropriate for considering

unique or critical events, which by definition cannot be repeated, my research does not consider either of these. Multiple case studies provide an opportunity for replication. Replication allows the research to repeat a defined line of enquiry in several discrete situations, which is what my research will do. There are two forms of replication, theoretical and literal. Theoretical replication occurs when cases produce different outcomes for predicted reasons. Literal replication occurs when cases are carefully selected to predict similar results. I am seeking literal replication as the desired outcome for my research where the intention is to consider possible links between expert's individual characteristics and expert's decision-making processes.

Possible flaws associated with case studies.

Case studies have been criticised for several reasons. Some case studies have not been well presented, and have demonstrated researcher bias, which has influenced what has been presented as findings and conclusions; I have tried to avoid these flaws in my research. Another criticism is that case studies do not permit generalisability to a larger population, and I have acknowledged this restriction in my thesis. The time required to carry out a case study has also drawn criticism however, a multiple case studies methodology is the only method that will satisfy the needs of my research and the time that it takes must be accepted as the cost of good research.

In my selection of procedures I was constantly aware that it is not the methods themselves that are most important. It is the link between the ontological and epistemological assumptions of the researcher and the overall research effort that establishes knowledge (Morgan and Smircich, 1980). Therefore to maximise the return from my research effort, and allow my ontological and epistemological assumptions free reign, I elected to use a case study procedure as a research 'instrument' (Stake, 1998). Through my research I mean to develop a better understanding of how and why experts act as they do in a particular context, and I believe that, for the reasons set out below, case study procedures are the most suited to my purpose.

First, I have experience with case study procedures, and I am confident that I can carry out research using these procedures. This confidence allows me to concentrate my attention on issues and events that occur, rather than the procedures that need to be adhered to.

Second, an important reason for using case study procedures is that they are always contextual (Miles and Huberman, 1984; Strake, 1985). As I have mentioned earlier, my research question demands answers, which inform about experts working in their natural setting. A case study always takes place in a specified bounded context or setting, in which events, processes, and outcomes can be studied. Case studies attempt to describe contextual effects on behaviour, not control or eliminate their influence as a laboratory study would (Strake, 1985). A case study permits an expert to be observed within his/her domain of expertise.

Thirdly, an important reason for selecting a case study procedure that is not mentioned by Miles and Huberman (1984), is that case study procedures can also provide a contextual understanding (Guba and Lincoln, 1989). It is not just the conditions and circumstances [context] relevant to events that are of interest, the weaving together of the processes and the interwoven structure [contexture] (Fitting, 1991) are of particular interest in my study.

Fourthly, to successfully obtain the data for my enquiry, I need to get close to respondents to observe them and communicate with them in a natural setting. The experts, who become the respondents for my research, are busy people who, although they agree to participate in my research, can make very little time available. Therefore it is necessary to obtain as much information about their activities as quickly as possible. I believe that no other qualitative procedure could achieve this goal.

Finally, my selection of case studies follows Guba and Lincoln's, (1989), guidance for 'constructivist' enquiry, discussed earlier in the chapter, and their recommendation that a case study report is the most appropriate way to present qualitative findings.

As I stated earlier, I elected to use case study procedures to examine particular experts in a specified context. My choice allows me to select cases on the basis that they appear to provide an opportunity to learn about my research topic, rather than to find 'typical' examples (Stake, 1998). Opportunity to learn appears to equate with the time that can be made available by a suitable respondent, not with their typicality. In selecting cases to study there is a need to recognise that potential for learning is different and at times a preferred criteria to representativeness. It is, according to Stake, often better "*to learn a lot from an atypical case than a little from a magnificently typical case*" (p. 101). This gives strong motivation for selecting a suitable case that is potentially easy to access for a sustained period.

6.2.3 Multiple case study

One case study may be expected to provide interesting insights about what shapes an expert's managerial decision-making processes, but multiple-case studies have the potential to show that patterns and hierarchies are repeated. Yin (1994) stresses that multiple-case studies should not be confused with sampling; he considers that multiple-case studies are analogous to repeated experiments. In multiple-case studies, as in repeated experiments, the research design and data analysis is interconnected so that cross case conclusions may be possible. It is therefore seen that the cases of a multiple-case study are not random samples; they are repeated attempts to demonstrate the existence of particular events within a specified framework. A multiple-case study requires careful selection of cases so that each will either produce similar results, 'literal replication', or for predictable reasons, produce contrasting results 'theoretical replication'. If literal and/or theoretical replication proves to be possible then the initial propositions are seen to be supported, if replication is not possible then the propositions may be false.

Chapters 2, 3, 4, and 5 of this thesis have developed the rich, theoretical framework required to support this type of enquiry (Yin, 1994). Evidence has been presented which indicates that there are powerful influences at work within the setting being examined.

6.2.4 Selecting an appropriate case study procedure

Case study research, according to Avison (1997), examines a phenomenon in its natural setting with the researcher as independent outsider. This simple statement encapsulates the idea of a case study, however, it does not inform about what the study sets out to achieve, or what happens within the study.

A case study can be written for different purposes, such as teaching, recording, or describing. Case studies can also take different analytical approaches. A factual approach attempts to represent the actual occurrence observed as accurately as possible, as in a historical record. An interpretative approach attempts to find inner meaning to explain what motivates the occurrence. An evaluative approach attempts to assess the importance or benefit of the occurrence. The case study developed in accordance with any combination of the above, will require different actions from the researcher. A simple record may suffice for a factual account of events, but a detailed examination of events may be required for interpretive or evaluative case studies (Guba and Lincoln, 1989).

6.2.5 Data collection

Having declared myself as an interpretivist, it seems clear from the above that a detailed record and description of events is required to answer my research question. This approach should be sound provided that sufficient information is elicited to form a detailed account of how the expert behaved in decision-making situations. However, it will not be sufficient to simply record what the expert does. A critical issue is why the expert behaves as he/she does. As an observer recording a factual account of the expert's behaviour, I cannot presume to know why they behave as they do. Therefore, a triangulated approach to data collection will be adopted. Appropriate questions will be asked of the experts in semi-structured interviews. The expert's work associates will be interviewed to obtain additional information, and the experts will be evaluated with psychological tests (see section 2.7).

The nature of my study dictates and limits how data can be collected within the case study methodology. Yin (1994) identified “*six sources of evidence*” (p. 79), documentation, archival records, interviews, direct observation, participant observation, and physical artefacts. Of these only interviews and direct observation are appropriate for my study. Documentation, archival records, and physical artefacts are clearly of little consequence. Participant observation is a form of action research. It is often based on gaining knowledge through change, and requires that the researcher participate in the activity being observed. Neither occurrence was desirable for my research. First, I required an understanding of the status quo, so I definitely did not want to change the setting; I wanted to influence the respondents as little as possible. Second, I am not at all expert in the settings in which my enquiries took place, so it was unlikely that I could have made a meaningful contribution to events within the study.

6.2.6 Verbal protocols

I chose not to use verbal protocols for reasons that are explained in the following examination of the procedure. Yin does not mention as a source of evidence the think aloud commentary known as verbal protocols. This means of obtaining data has been used by many researchers (Ericsson and Simon, 1985; Ericsson, 1997). However, the validity of data obtained through verbal protocols has been questioned (Doherty, 1993; Mintzberg, 1989). I share Mintzberg’s concern about an expert’s ability to concentrate on a complex task and to simultaneously provide a commentary. It is possible though, that the information that the expert is able to provide may help the observer to form a clearer understanding of the actions being observed. The behaviour of experts in managerial decision-making situations appears, to me, to be readily accessible through direct interview, observation, and third party interviews. I did not use a formal verbal protocol procedure, but I did ask for simple verbal explanations when I thought that they could help my understanding of the events before me.

6.2.7 Psychological evaluations

My research question asks what shapes the managerial decision-making processes of an expert. Clearly, an important factor to be considered is the personality and cognitive style of the person. This topic has been considered in Chapter 4.

To be able to consider the influence of cognitive style and personality as shaping factors I will assess the expert's with the Cognitive Styles Analysis (CSA), the Myers-Briggs Type Indicator (MBTI) and the Repertory Grid Technique (Rep Grid). I selected the CSA because it is a simple computerised and interactive tool that appears to have validity (although it has not been validated for New Zealand), which provided an additional opportunity for me to observe the respondents in a decision making situation. As the data analysis shows some interesting information was obtained. The MBTI was used because it is widely used in management assessment, which gave it credibility with the respondents. I am registered to use what may be seen as more sophisticated psychological assessments, but I considered the MBTI to be adequate for this research. The Repertory Grid Technique, discussed in more detail later, was primarily selected because it also created an additional opportunity to observe the respondents in a decision making situation.

I considered that a comparison of the data gained via the psychological assessments and the data obtained through interviews and observation could be interesting, and perhaps revealing. Additionally, the psychological assessments form part of the triangulation process being used to assure the overall trustworthiness of the data.

The evaluations, as I have mentioned, provide additional opportunity for informal conversation with the expert's about their decision-making, and for observation of the experts making decisions. It is difficult to obtain time with experts, and there is a need to justify to them the time required. By using alternative procedures that are acceptable to the respondents additional data collection time is created. The extra time permits a different data gathering process, which ensures that the experts are considered from alternative perspectives. Considering three sets of

data, interviews, observations, and psychological evaluations, is a triangulation process that can provide a richer and deeper understanding of the respondents than would otherwise be available (Corner, 1991; Denzin, 1978; Fielding and Fielding, 1986).

6.2.8 Defining and locating suitable respondents

My research seeks answers about what shapes the managerial decision-making processes of experts. Therefore the unit of analysis for my research question is an 'expert'. Therefore to carry out my study, first I have to define suitable respondents and then locate people who meet the criteria that were willing to participate in my study.

As there is no formal procedure for identifying an 'expert', I used a definition of an expert which falls well inside the range of definitions used by other researchers in the field, as discussed in Chapter 2 (see Einhorn, 1974; Ericsson and Smith, 1991; Ericsson and Charness, 1994; Shanteau, 1992).

6.2.9 Definition of an expert for my research

The respondents (subjects) are people who meet the following criteria, and therefore have a demonstrated qualification as an expert.

- They are formally trained and qualified for their occupation.
- They have at least ten years experience in their domain of expertise.
- They are recognised by their peers as competent practitioners within their field of expertise.

6.2.10 Managerial qualification

As my research examines the managerial decision-making processes of experts, there is a requirement for these experts to be employed as managers for large part of their working time.

The experts that are the respondents for my case studies make many managerial decisions that are not within their domain of expertise. However, some managerial

decisions are similar to decisions that the experts would have made before becoming managers, and the respondents continue utilise their training to make decisions that are related to their field of expertise.

6.2.11 Locating experts for my research

The people who were the respondents in the case studies on which my research findings are based were located through my personal network of associates. They are domain experts, and they manage people and business functions associated with their domain of expertise.

This concludes section two. In the next section I report on the research procedures that occurred during my study.

6.3 Research Procedures

In this section I present the research procedures that were used for my study. I examine each procedure on the basis of its prior use and suitability for my research, and then I explain how I used the procedure.

After I had received approval to proceed, from the University of Waikato Management School's Research Ethics Committee, I arrange to meet the people that I hoped would agree to participate in my research. At the initial meeting I explained the purpose of my research to each prospective respondent and asked if they would be willing to participate. Each person approached agreed to be a respondent, and signed a consent form. I then asked each respondent to provide information about their education and training, and their managerial role. I used this information to satisfy myself that the person is, by my definition (stated earlier in this chapter) an expert, and that they are working in a defined managerial role. As I had selected the people on the basis of my prior knowledge of them and on advice from associates, the information was used to confirm my

assumption that the person could be accepted as an expert working as a manager. The information was also used, where appropriate, to aid in the development of the case study protocols, and to form specific questions in the subsequent interviews. This occurred either when I did not understand something contained in the information, or where the respondent had mentioned something which if elaborated had the potential to provide interesting data. The case study protocols, and a synopsis of pertinent information from each respondent are discussed in the relevant case study report. The forms containing the written questions are in the appendix.

6.3.1 Interviews

Interviewing using free form discussion has the potential to provide rich information (Berg, 1995; Creswell, 1994; Easterby-Smith *et al.*, 1991). However there are several potential problems with interviews. The interviewer must know what information is sought, and must be able to pursue it without distraction. The interviewer must not introduce bias by inappropriately leading the interview; the interviewee must offer their own answers, not those alluded to by the interviewer. This is perhaps unlikely with experts. Although an expert can be expected to be sufficiently confident of his/her knowledge and understanding within his/her field of expertise, it is possible that the respondent may be subject to 'demand effects' causing him/her to offer answers that he/she thinks the interviewer wants. There is also the possibility that limitations due to retrospective reporting, and biased self-awareness can be present. Structured interviews give some control over the interviewer and ensure that essential questions are asked.

However, the rigidity of the structured interview can be clumsy and not conducive to free flowing information from the person being interviewed. Informal interviews allow a more free ranging conversation, but depend heavily on the interviewer's skill to steer the conversation. I thought that an open ended structured approach was more appropriate. It delimits, to some extent, the topic of conversation but does not stop the interviewer pursuing interesting responses to gain more information. It is also more aligned with this researcher's informal interviewing approach, which has developed over many years practice in human

resource management. Also remembering that the interviewer, by the nature of the process, interacts with the respondent inevitably introducing bias (Easterby-Smith, 1991), and that the interviewer is also the observer, I thought that a procedure with which I am comfortable was the most appropriate. First, if I, as the researcher, was at ease while conducting the interview, then the possibility that respondent would also be at ease was enhanced. Second, if I were at ease then my ability to make accurate observations without distraction would be improved.

The formal, written questions were constructed to present some resemblance of a formal interview structure to the respondent, but the questions were used as 'openers' for extended conversation where either the respondent or I wanted to continue beyond the initial question. The formal questions also ensured that, at the least, there would be some linking points between the case studies. So that some direct comparisons between cases would be possible.

Interviewing was the major source of data in my research, but it was supported with other information obtained from verbal comment and personal observation (Olsen and Biolsi, 1991), and through psychological testing. As it is considered to be an important way of gaining information by many researchers (Ericsson, 1997; Doherty, 1993), I discuss verbal comment as a separate issue in the next section.

6.3.2 Verbal comment

Comment by the expert during a decision-making process is a well tried methodology that has enabled the capture of data, and perhaps knowledge, concerning many activities that require intense mental activity with little or no obvious activity to suggest what the outcome will be or how it will be achieved (Ericsson, 1997). The initial enthusiasm for verbal reporting was met with considerable criticism as flaws in the methodology were identified (Doherty, 1993; Mintzberg, 1976). The problems of personal bias, limited recall ability and the reliability of the recalled material called into question the overall validity of the method.

However, the development of human-information processing theory by Newell and Simon (1972) lead to recognition of verbal reporting during an activity, rather than retrospectively, as a source of reliable and valid information (Ericsson and Simon, 1985). For this procedure, known as task analysis (Ericsson, 1997) to be valid, it is essential that the information obtained is spontaneous commentary, of thoughts induced by the task, and therefore valid verbal comment on the activity taking place. It is not a running commentary. Otherwise, the respondent may state what he/she thought that he/she was doing, which may not be the same as what actually occurred (Doherty, 1993). Bias is easily introduced if the person is asked to report retrospectively e.g. why did you do that?, or if the person is asked to elaborate on an activity as it proceeds (Ericsson, 1997). However, where an account of how or why a person acted is required, retrospective reporting is the only way that the actor can account for his/her actions. This kind of verbal reporting, often called protocol analysis is now considered to be an important process in many fields of research.

Interviews and verbal reports are, as Olsen and Biolsi (1991) state, the only direct methods available to identify expert's concepts and strategies, therefore it is necessary to use them, but cautiously. My research relies heavily on the respondent's verbal comments in response to my enquiries. Verbal responses formed the major part of my data. As I have mentioned earlier, the respondents had very limited time available for my research. Therefore I required a procedure that allowed me to extract as much information as possible from the respondents in the time available. A verbal response is far quicker than a written one, and has the added advantage, from the researcher's perspective, that the person responding often gives several answers to ensure that he/she has conveyed to the researcher the best answer. This creates a richer picture of the respondent's thoughts.

6.3.3 Observations

Olsen and Biolsi (1991) suggest that the possible bias of verbal reporting can be avoided by merely observing performance. This simple solution is of little value if most of the expert's performance is cognitive, however. They suggest that the expert could be observed with a video recorder, and that the expert could add

commentary while he/she watched a rerun of his/her performance (Shephard and Kirkwood, 1991). This appealing solution would probably be easier for the expert, because they could concentrate on their performance while the activity is recorded without interruption of their mental activity. But it could lead to the problems that have been identified with verbal reports. [see S3.2 above]

An alternative observational method is to ask the person to repeat the process, then interrupt him or her at any time when what they are doing is not clear from previously recorded data obtained through interview and verbal reporting. This method would require a very composed and patient expert. It would also be very time consuming. The benefit assumed with this method is that the expert will have immediate memory available to support comment, but an interruption from the enquirer may dislodge that memory and it may also cause difficulty for the expert to restart the process.

Information obtained through the observation of general activities may enhance the quality of the data recorded, provided that it is correctly interpreted (Easterby-Smith, 1991). Activities such as interaction with other people, use of information gathering tools, use of decision-making aids, as well as the decision-making process as it is evident during the observations, have the potential to provide valuable information. The researcher's observations can be recorded as they happen by recording verbal commentary. This has the advantage of being immediate.

Observation was an essential and continuous part of each case study. I noted the respondent's reaction to me as the researcher, and to the questions and tests that I used to elicit information.

6.3.4 Data recording

The participant provided initial biographical data, either verbally or in written form. Subsequent data was a mix of verbal, written and observed information. A tape recorder was an essential tool for data collection to capture accurately, and in detail, the person's verbal expression of his or her thought processes. Throughout

each case study, and after each contact with the respondent I made hand written notes of my observations. I tried, as much as possible, not to interrupt the flow of proceedings, consequently some written notes were made some time after the observations that prompted them.

6.3.5 Administration of psychological evaluations

As part of the triangulation process being used to answer my research question I sought a psychological evaluation of the respondents to provide information about their personality and cognitive style. As has been shown in Chapter 4, there are highly developed psychological characteristics that should be taken into account when considering experts.

The following evaluations took place:

Repertory Grid Technique

Cognitive Styles Analysis (CSA)

Myers-Briggs Type Indicator (MBTI)

For the CSA and MBTI evaluations, established administration procedures were followed. In the case of the Repertory Grid Technique (Rep Grid), some procedures need to be modified to suit the particular study in which the Rep Grid is to be used. I found it necessary to modify some aspects of the data collection procedure, and these changes are explained shortly [6.3.6].

The evaluations were used to provide a psychological profile of the respondent that, I thought, would provide useful triangulation. The CSA, MBTI, and Repertory Grid Technique were examined in Chapter 4. The tests were administered as the final part of each case study. Furthermore, in an attempt to reduce researcher bias, the tests were not marked until after the personal observations were written up. However, the verbal commentary obtained during test administration could not be avoided and was therefore included in the interview and observation data.

6.3.6 Repertory Grid Technique

The background to this evaluation technique was briefly examined in Chapter 4, 4.3.1.2. Here I provide an outline description of the variation in the data collection phase of Repertory Grid Technique (Rep Grid) that took place in my research. Other than this variation, which is consistent with contemporary use of the Rep Grid, the overall Rep Grid procedure followed in my research is similar to that used by other researchers. A detailed explanation of the workings of the Repertory Grid Technique is presented in *A Manual for Repertory Grid Technique* (Fransella and Bannister, 1977), and extensive information is also available at the following University of Calgary websites: <http://tiger.cpsc.ucalgary.ca/>. and <http://ksi.cpsc.ucalgary.ca/PCP/PCP.html>.

After reading several reports on the use of the Rep Grid Technique I realised that the real value, to a qualitative researcher, is the dialogue associated with the data collection. It is my belief that, for the purpose of my research, the reasons given by respondents for their selections are potentially more interesting than the outcomes from statistical evaluations. This follows what Kelly (1955) indicated to be an essential first procedure in the evaluation of the collected data, and leads me to believe that the evaluation can meaningfully start earlier than the grid formation.

The Repertory Grid Technique data collection procedure requires respondents to verbalise their consideration of words associated with the process being evaluated, to consider word associations and attempt to explain them, and finally to make judgements about their personal valuation of words representing decision-making processes.

My use of the Repertory Grid uses Kelly's (1955) original concept of eliciting relationships, but unlike Kelly I am interested in how the respondent relates to decision processes, not people. As mentioned earlier, my use of the Rep Grid is similar to that of Stewart, *et al.* (1981) in business applications, who in one situation used the Rep Grid to elicit information about quality control inspection. The respondents were first asked to select words that they associated with the

quality control process, and then asked to explain why they made those particular associations.

There is no formal procedure for selecting words to be used in the Rep. Grid, although interactive computer evaluations do suggest possibilities to respondents once they have made an initial choice. The enquirer selects what he/she considers to be important for his/her research (Fransella and Bannister, 1977). I carried out a pilot test to determine how many words were appropriate for my study, and concluded that seventeen words in total provided an adequate pool from which the respondent could select associations. Consequently, respondents were asked to select nine words, from the list of seventeen presented, which in their view were representative of the decision-making situations that they faced as managers. Nine words were selected for two reasons. First, in trials I found that seven to ten words were about the comfortable limit for most people. The first seven to ten selections tend to be immediate or spontaneous, and therefore appear to be what the respondent closely associates with his/her decision-making. Once past spontaneous choice the respondent starts to deliberate and be hesitant, perhaps choosing additional words with little importance just to satisfy the enquirer. As I was interested in dialogue, I considered that the early spontaneous responses were likely to produce the most interesting comment.

The second justification for requiring nine words to be selected was the procedures that define the Repertory Grid Technique. As I was not interested in statistical evaluation, I did not need to form a large data matrix, as Kelly had done. The only constraint, in my application of the Rep Grid, was the requirement for the respondents to be able to form a triadic word selection.

To elicit associations, and the consequent explanatory dialogue, respondents are required to select two words, which they associate with one another, and to explain why the words are related. Next they are asked to select a word that is, in their opinion, contrary or negatively associated with the first two words selected, not just an opposite. Again the respondents are asked to comment on the selection and its association with the other two selections. Nine words satisfied the requirement to be able to work in threes. I subsequently realised that, because

there was no constraint on how many times the respondent could use particular words in the triadic associations, the number nine was not significant. However, I chose to stay with nine selections.

Once the interviews and the data were recorded, standard Repertory Grid Techniques were followed. The data was evaluated, via the Internet, by the WebGrid II facility at the university of Calgary. WebGrid II is a dedicated facility that I consider to be better suited to the analysis of Repertory Grid data than the more generic statistical packages such as SPSS and SAS. Calgary University is the home site for Personal Construct Psychology (PCP), Repertory Grid Technique (Rep Grid), Personal construct Theory (PCT), with links to sites around the world including the UK and Australia. The site has extensive, up to date information relating to Rep Grid and PCP. WebGrid II was developed by Shaw and Gaines, mathematicians and software engineers at Calgary University (Professor Shaw is the Director and Chair) and is an extension of Shaw's work at the University of London at the time when Kelly was working on computational methods for his Repertory Grid Technique. After Kelly's death Shaw continued her work on computational models of personal constructs with Slater, resulting in the INGRID computational model now based in New Zealand (see:- <http://homepages.ihug.co.nz/~income/jimekus.html>). Shaw then constructed her own computational model known as the FOCUS algorithm, which is in turn appears to be an extension of Slater's work with Kelly. Shaw's cluster analysis, known as the FOCUS algorithm, and the Principle Components analyses, which is part of Slater's INGRID analysis, were applied to the data obtained in this research, however, only the cluster analysis is presented as it gives the most pertinent information.

6.3.7 Case reports

In a previous section of this chapter [S6.2.2] I stated why, in my view, a case study procedure is the most suitable for this research, and I explained what the use of case study procedures is intended to accomplish. I need now, to state what particular case study procedures I followed. As I mentioned earlier, case studies are widely used in the social sciences, and as a consequence there appear to be a

number of different approaches to the case study procedure. As I have relied heavily on the constructivist paradigm (Denzin and Lincoln, 1998; Guba and Lincoln, 1989; Lincoln and Guba, 1985) to guide my research procedures to this point, it seems prudent to continue on this path and adopt the case reporting procedures that are an integral part of constructivist inquiry.

Constructivist inquiry case reporting procedure is founded on the following: First there are substantive considerations and methodological considerations. The substantive component forms the actual case report, which is usually separated from the methodological component. This separation takes place because the case report is intended for the ‘consumer’, while the report on the methodology is more often aimed at the inquirer’s ‘peers and/or critics’ who may not be consumers. In this thesis the methodological component is addressed in this chapter, and the case reports make up Chapters 7 and 8.

Second, constructivist case reports begin with an explanation of what the study set out to achieve, followed by a thorough description of both the setting in which the enquiry took place, and of the processes relevant to the problem that were observed in the setting. This part of the constructivist case report is the ‘thick description’ that is intended to form a base of information that will allow anyone who is interested to consider the possibility of transferability. The thick description is followed by a discussion of the important issues that arise from the setting and a discussion of the outcomes of the enquiry. From these discussions explanations in the form of working hypotheses may be developed. In this thesis Chapter 7 contains the justification for the study, and the thick description, and Chapter 8 contains the discussions on important issues and outcomes, in the form of case analyses.

6.3.8 Case analysis

Chapter 8, as mentioned above, presents my analysis of the individual case reports in response to my research question – What shapes the managerial decision-making processes of an expert? In that chapter I examine the four case reports seeking answers to the five subordinate questions derived from my research

question. [see Chapter 5, S4.2] Answers to these questions have, I believe, the potential to produce interesting and possibly important new knowledge.

6.3.9 Cross case analysis

A further evaluation of the case reports applying a cross case analysis helps to satisfy the requirement for credibility. This approach also provides an additional opportunity to identify important issues, which may support, or confound, the issues identified in the individual analysis. Furthermore, the cross case analysis provides an opportunity to identified patterns and explanations of a more general nature. However, any cross case generalisations can only provide working hypotheses, not generalisations (Guba and Lincoln, 1989).

This process can be compared with the procedure for analysing case study evidence suggested by Yin (1994), but my interpretivist approach does not compare empirical evidence with predicted patterns as Yin suggests should happen. Instead I explore the thick description of the setting and processes it contains to look for patterns and events that may provide explanations. I follow the well-established procedure of looking for important issues, and general dispositions (Bromley, 1977; Guba and Lincoln, 1989; Lincoln and Guba, 1985). I then compare my findings with existing theory. However, if in my view existing theory does not provide an adequate explanation for observed events, then I will look for alternative rationale.

In summary, I am looking for the respondent’s general disposition towards recognisable decision-making processes, and any associated issues that appear to be important. In particular, I want to identify any natural inclination or tendency for the respondent to follow identifiable paths to solutions. I then compare these general dispositions with existing theory in an attempt to explain the findings. First I look at the individual cases, then I compare across cases in an attempt to find explanations that are, for these four cases, mutually satisfying.

6.4 Research constraints

6.4.1 Researcher effects

I was aware of possible bias due to researcher effects, and I attempted to acknowledge them where I was conscious of them.

Additionally, I attempted to follow the trustworthiness criteria mentioned earlier in the chapter (Guba and Lincoln, 1989; Lincoln and Guba, 1985).

6.4.2 Trustworthiness

The issue of credibility (see section 1.6) was dealt with by: -

- Prolonged engagement. Each case varied in terms of engagement, but all of the respondents made themselves available for sufficient time to enable my research plan to be completed. However, I was not ‘adopted’ by any of the respondents, and I think I retained the ‘enquirer’ perspective (Berg, 1995; Guba and Lincoln, 1989; Mintzberg, 1983).
- Persistent observation. During the engagement with the respondents I tried to ensure that as much relevant data as possible was collected (Guba and Lincoln, 1989; Ericsson, 1997).
- Triangulation. I interviewed and observed the respondent, then I interviewed two people who work closely with the respondent to gain their perspective on the respondent. I also used five distinctly separate tests to gain a third perspective of the respondent (Fielding and Fielding, 1986; Jick, 1983).
- Referential adequacy. All data is available in its original form and may be scrutinised, subject to privacy laws (Easterby-Smith *et al.*, 1991 Guba and Lincoln, 1989).

- Member checks. The findings of each case study have been referred back to the relevant respondent to obtain his or her opinion (Guba and Lincoln, 1989).

The issue of transferability is satisfied by the account of the case studies that follows, and information provided in the appendices (Creswell, 1995; Guba and Lincoln, 1989).

The issues of dependability and confirmability (Easterby-Smith, 1991; Guba and Lincoln, 1989) rest with me. I have attempted to ensure that the enquiry is internally coherent and that all the findings are supported by data.

6.4.3 Delimitation

This study is confined to interviewing, observing, and testing domain experts in managerial positions to examine their decision-making processes.

6.4.4 Limitations

- This is an exploratory study, which examines some potentially interesting behavioural aspects of four distinctly different domain experts. A study of this nature does not permit any firm conclusions to be made about the actions of other experts. At best some aspects of this study may justify further research. Therefore, the study does not claim any general application across areas of expertise, management, or decision-making.
- Given the nature and assumptions of qualitative research the findings of my research could be subjected to other interpretations.
- The psychometric tests used in this research are not intended to be comprehensive; they are used as additional data to aide in assessing the validity of data gained through other sources, i.e. as a triangulation aide. Consequently no detailed psychological reports are presented.

6.4.5 Ethical considerations

Permission to undertake the study was obtained from the Waikato Management School's Research Ethics Committee. All respondents were advised verbally and in writing of the purpose of my research, and advised that they could withdraw at any time if they chose to do so. The letter of approval and blank copies of the forms presented to the respondents are included in the appendix.

6.5 Chapter Summary

Qualitative research is not a new form of enquiry, but the procedures still create some controversy (Berg, 1995). Therefore, I have presented a review of the central concepts of qualitative research, with particular attention paid to paradigms, ontology, epistemology, and the issue of trustworthiness associated with qualitative studies (Burrell and Morgan, 1979; Denzin and Lincoln, 1998; Guba and Lincoln, 1989; Lincoln and Guba, 1985).

For any enquiry to take place under the umbrella of 'qualitative' research it is necessary for the researcher to understand where he/she 'stands' within qualitative research, and to recognise the constraints and the freedom that define that stance (Creswell, 1994; Easterby-Smith *et al.*, 1991). In this chapter I stated my justification for the research procedures that I adopted. I examined several alternatives within the appropriate research paradigm, and stated why I think a multiple-case study procedure is appropriate for my research.

I then discussed ways of collecting data within a multiple-case study procedure. I stated that I chose to use interviews as the main data collection procedure, and that I would use researcher observation and psychological evaluations to triangulate the research perspective (Fielding and Fielding, 1986; Jick, 1983). I also discussed how the data was recorded, and the administration of the psychological evaluations.

The chapter concluded with a statement on the research constraints that I, as the researcher, have recognised. I addressed researcher effects, trustworthiness, delimitations, limitations, and ethical considerations.

CHAPTER 7



Case study reports

In this chapter I present a ‘thick description’ (Guba and Lincoln, 1989; Lincoln and Guba, 1985) of the setting and respondents that form the database for four case studies. This qualitative approach is, as explained in Chapter 6: Procedures, based on constructivist inquiry procedures (Denzin and Lincoln, 1998; Guba and Lincoln, 1989; Lincoln and Guba, 1985).

The chapter begins with a preliminary discussion of some important parameters that constrain the case studies that makeup the remainder of the chapter.

7.1 The case reports

The ‘thick descriptions’ of the respondents, and the settings in which they work, presented in this chapter provide an information base for the case analyses that follow in Chapter 8. Additionally, the thick descriptions should enable anyone who wishes to assess the transferability of my findings to do so (Guba and Lincoln, 1989; Lincoln and Guba, 1985). The case reports that make up the thick description are the result of my attempt to gain meaningful information which I

could synthesise to develop an answer to my overarching research question, which is – What shapes the managerial decision-making processes of an expert?

Although, the case reports are representative of the information obtained through interviews, observations, and psychological evaluation, they do not contain all the information that is available. I am of course aware of the need to provide a solid information base for this thick description, but I must also accept the constraints imposed upon the size of a thesis. Consequently I have attempted to include an example of all the various types of information, and therefore most of the information that is not presented can be considered to be supporting data, which repeats and confirms that which is contained in the case reports.

Each case report begins with a short explanation of the circumstances that prevailed during the study, and of how the study was carried out. Once the background to the research situation is established a vignette of the respondent is presented, and then the data obtained through interviews, observation, and evaluations is presented.

7.2 The four cases

The four cases are similar in that they study experts who have moved into management positions. However, each case is different in that the respondent is performing different tasks in a different contextual environment.

7.3 Respondents

To be sure that the correct person is identified and to separate them from other people who are mentioned in the case reports, and to protect their identity, the

person who features in each case is referred to as the ‘respondent’. The term respondent is used throughout constructivist inquiry to identify the person who is the focus of the study (Guba and Lincoln, 1989; Lincoln and Guba, 1985).

7.4 Data collection

Constraints imposed by each expert’s occupation defined the nature of the data collection process. As a consequence, data was obtained at a time dictated by the expert’s business schedule. In one instance, Case Report Number One, I was able to observe the person at work from mid afternoon until late in the evening on one day, through eight in the morning until late in the evening on the following day, and for approximately two hours the third day. The people who feature in the other three cases were only available for periods of one to two hours at a time, by appointment, so I met with each of them at least five times. I also had several brief phone conversations, with each of them, to gain supplementary or clarifying information. In addition all of the respondents provided personal background information in writing, completed a questionnaire asking for specific information related to their training and experience within their domain of expertise. The respondents also completed the CSA, Repertory Grid, and the MBTI psychometric tests.

In addition to interviewing the respondent, I interviewed several other people in each case to gain additional information. For the first case I was able to interview one additional person who has known the respondent for more than ten years, and to speak with seven of the respondents clients. In the other studies I was able to interview two or three additional people who have known the particular respondent and worked with him/her for at least 18 months. The interviews lasted between 30 and 40 minutes, and some provided additional material by e-mail subsequent to our discussion. For each person, that is the four respondents and the people providing additional material, I transcribed the tape-recorded information, along with all other information and entered it all into a database.

7.5 Definition of an expert for my research

The respondents two male and two female, are people who meet the following criteria, based on definitions established by Ericsson (1997), Carroll and Johnson (1990), and Shanteau (1987;1995):

- The respondents are formally trained and qualified for their occupation.
- The respondents have at least ten years experience in their domain of expertise.
- The respondents are recognised by their peers as competent practitioners within their field of expertise.

7.6 A Vignette

Each report begins with a vignette of the person who was the respondent in the study. The vignette provides background information about the person to enable readers to create their own understanding of the person who features in the study. While I have attempted to construct a good picture of each respondent, I have also remained aware of the need to protect the respondent’s privacy, consequently I have been careful to avoid providing any information that would identify the respondents.

7.7 Interview transcripts

Following the vignette of the respondent is a report of the interviews that took place. First I report on the conversations between the respondent and me, the interviewer. Next I report on the conversations that took place between working

associates of the respondent and me. Finally I present a summary of the respondent's psychological evaluation.

Although I have retained all the interview transcripts, I present only a synopsis of the conversations. I recognise that the actual words spoken, and the structure of the sentences, often convey meaning beyond the words and that contextual information may be lost in a synopsis. However a full presentation of the interview transcripts, which exceed one hundred pages, is not reasonable.

7.8 Observations

My record, of how the person appeared to me, follows the interview reports. What I observed, how the respondent seemed to approach decision-making situations, and what I thought the person was doing. This part of the report is based on my continuous observation of the respondent, which includes the non-verbal responses during interviews, informal conversations that were not recorded, and privileged moments when I was present during the respondent's attendance to managerial decision-making.

7.9 Psychological evaluations

A summary of the findings from three psychological evaluations is reported. Although the administration of the psychological evaluations and subsequent assessment of the evaluations follow standard procedures, the reports contain only sufficient information to enable triangulation with the data obtained through interview and observation; they are not detailed psychological reports.

The Repertory Grid Technique (Rep Grid) is first presented as a transcript of the respondent's conversation during the evaluation. The transcript from a Rep Grid evaluation provides, I believe, a good insight to the respondent's decision-making process. The transcript is followed by an assessment of the constructs and elements developed by the respondent as part of the Rep Grid evaluation. This assessment is presented in figures with a written assessment of their content.

The Cognitive Style Analysis (CSA) and the Myers-Briggs Type Indicator (MBTI) reports are abstractions from the appropriate manuals, based on a careful analysis of the information provided by each respondent.

Case report number one

This was the most difficult case study. If it had been possible, this study would have been conducted later, after the cases that follow, but the respondent was near to the end of his season in New Zealand and was preparing to travel overseas. Therefore, this was the only time available. The study was made difficult by the very limited time he could make available to me, during which he was constantly working. This meant that I had to carry out the study over a period of two and a half days, with no time to return to any part of the study for clarification. Nonetheless, the respondent was interested in my research, and made a special effort to ensure that I got the information that I asked for.

In addition to this two-day data gathering session, I had spent four and a half days with the respondent several months earlier, as a client of his business. On both occasions, I was able to talk with the respondent, and his clients. Being with the respondent and his clients allowed me far more opportunity to observe, and to make notes about the respondents actions while he worked, than I had in the later case studies.

Unfortunately, the formal aspect of my research for this case study was rushed due to the limited one-to-one time available, and could have benefited from lessons learnt in the later case studies. However I did fax some additional questions to the respondent, and his answers have help to fill some gaps.

A vignette

The respondent in this case study is a British male, from Yorkshire, England, age 49. He is the manager/chief instructor/owner of a highly respected outdoor pursuits centre in New Zealand. He has a Bachelor of Education Degree with a major in geography, and a Teaching Certificate, both obtained in the UK. He has completed, over a period of five months, a business and computing course at a polytechnic in New Zealand. He holds the New Zealand Outdoor Instructors Association (NZOIA) highest-level qualification in Kayaking, Caving, Mountaineering, Rock climbing, and Rescue. He is the most highly qualified instructor in NZ, and. He also holds American Canoe Association (ACA) qualifications.

Before settling in New Zealand, he was a schoolteacher, *“7 years as teacher at an English Catholic Grammar School, a boys school”*, and he represented the UK, in slalom kayak competition, for ten years. He left teaching when his involvement in expeditions reached a point where it required more commitment than was possible while teaching. After teaching he was *“doing almost anything – lecturing, relief teaching, cruising round the world between the UK US and NZ, jobbing instructing, doing what ever I could.”*

The respondent was one of a group of instructors who, in 1987, initiated the establishment of a qualifications and certification system for outdoor pursuit instructors in New Zealand, the New Zealand Outdoor Instructors Association (NZOIA). *“It seemed as though the whole world was pushing for paper, so a bunch of us pre-empted the issue. We did not want to be in a situation where we were forced to get qualified by local authorities, or by insurance companies, or by DOC [Department Of Conservation] people who know nothing about what we were doing. So we started are own professional association, and by consensus set our own standards, and I think that’s grasping the nettle.”*

Within the narrow field of outdoor pursuits this man is a legend. He has lead or taken part in kayaking and caving expeditions that have been first ascents, first

descents, first trip down river etc. in many countries around the world. Although he continues to be involved in exploration, he spends at least half of the year as *“manager/chief instructor/owner of a small business aiming at providing high quality instruction for small groups of people.”* He added that he is in fact only part owner. His wife, an accountant, is also part owner and according to the respondent she does all the organising, while he teaches. During the season, which is from September through to the end of May, there are several additional instructors employed, plus an office manager who attends to bookings, and other clerical duties.

Other than the five month polytechnic course, his management training has been what he calls *“in situ /experiential”*. He managed, or *“ran”*, an outdoor centre in Christchurch NZ, for five years with 3 or 4 staff. Prior to that he ran courses for business managers, at the NZ Outdoor Pursuit Centre. The courses were basic team building exercises combined with management development courses, and involved an educational psychologists who evaluated the clients. Despite his extensive, and impressive record in out door activities, he claims that he has had *“heaps and heaps of situations where despite my experience in the outdoors my salary has been determined by my tertiary qualifications. Having a degree and a teaching certificate has helped a lot... because that’s how society works, you still get paid for the bits of paper regardless of how good you are.”*

Interview transcripts

First transcript: A synopsis of an interview with the respondent

The respondent is clearly a very capable person in many outdoor pursuits. However, he sees his teaching ability as his most valuable skill. *“I’m good at*

teaching. I've got enough experience now to reasonably well pick out where people are at, to try and pitch the lessons and rivers at their ability level."

He does not see any overlap between his field of expertise and management requirements for running a business, but he does consider the polytechnic course in business and computer skills to have been beneficial. He stated, *"The level we run at is mostly common sense. The business programmes I've been on provide you with the tools of the trade. In other words the literacy skills and the organisational skills but I think running a business like this is seat of the pants intuition, about what gear to buy and how much money to spend on what. We are a dinky little business with all the usual problems of being under capitalised and over mortgaged and all the rest of it."*

The respondent considers the business,, to be a retirement plan. He states that after five years he hopes to be able to employ sufficient instructors to allow him *"to just go out and potter"*. However, he admits that he is not sure that he would be content not to be involved in teaching, and he is aware that *"you need a reasonable pyramid of people to pay for a manager and that's a contradiction of the aims of what we are trying to do. I do make an effort to get to know every body who comes on the property which I think is an indication of the size of your business I mean if you stop trying to do that then it's to big for what we are trying to do."*

The respondent's view is that the decision-making style that enabled him to become an expert in his field is one of *"impulsive recklessness bred on hard won, painful experience, and luck."* He attributes his reputation as an outstanding instructor to an *"ability to see clients in a time /skill continuum, and to deal with them at their level with a view to advancing their individual skills."* He considers that his strengths and distinguishing features are *"longevity – the joy of paddling!!"* and *"experience /enthusiasm, still."* As a manager he sees that his strengths are *"enthusiasm and single mindedness"*, and his weaknesses are *"lack of communication skill with other staff. Lack of financial skill"*

Second transcript: Comments from a fellow instructor

The comments here are from another top ranking kayaking instructor, who has known the respondent for more than ten years. He stated that the respondent “*has a typical Yorkshire man’s reluctance to show enthusiasm, and he is a very focused person, almost dogmatic.*” The respondent, in this person’s opinion, is a man of his word, who is highly respected through the outdoor pursuits industry.

In his view the respondent is a “*totally charismatic character*” who is remarkable because he is still has a deep love of kayaking after 30 years. He states, “The respondent demonstrates more personal interest than many much younger instructors with a lot less experience.”

Third transcript: Comments from clients

“*He is a friendly, social, and enthusiastic person, although he appears to be very independent.*”

“*He is perceptive, accepting, diplomatic, and accommodating.*” “*He enjoys his job, and it obviously keeps him very fit.*”

“*He is concerned about the environment, and works hard to promote an awareness of the need to look after the environment in the general public.*”

“*He demonstrates a strong appreciation of the freedom of the outdoors.*”

“*He is an effective teacher.*” “*He is well organised in connection with his main role, and conscious of his responsibilities on the job.*”

“*He is not too concerned with financial rewards, and does not like administration tasks.*”

Observations

Although the respondent stated that his partner, and the office manager attend to organisational matters, during my visits I noted that he often carried out these functions. Consequently I have, I think, a good understanding of the respondent's decision-making processes.

As a teacher he has an ability to relate to his clients in a way that appears to reflect the person that he is instructing. He can be the 'hard man' type with young male clients who want to 'push the envelope', by controlling them while pushing them so that they become skilled and safe in their outdoor activities. Yet he can be very understanding, and caring with other clients who are beginners yet to come to terms with the activity. Even with in a group of four, which is the maximum for one instructor, he makes a point of adapting his teaching methods to the individuals.

As his record in exploration demonstrates, he is obviously mentally strong, and determined, and this shows in his teaching. In outdoor pursuits, an inappropriate decision can result in someone being killed or injured. The respondent is well aware of the dangers involved in outdoor pursuits, consequently he is always attentive and never out of reach of his clients. He works hard to ensure that his clients do acquire new skills, and are aware of safe practices.

His decision-making processes appear to be automatic, although there was evidence of some analytic, or considered decision-making in managerial matters outside his domain of expertise. His interaction with the other instructors can be described as democratic. The instructors were told when their clients would arrive, and what kind of instruction the clients expected, and then they were left to organise themselves and teach the clients. During my observation the respondent told people what needed to be done, not what they should do. In my view the respondent takes his work very seriously, and uses his teaching skills to ensure that clients enjoy what they are doing while they are learning. He stated that he

leaves the organisational and clerical work to others, but he appears to be aware of what is happening.

Psychological evaluations

Repertory Grid Technique

Note. This application of the Rep Grid was rushed due to the limited time the respondent had available. He made very little comment during the word selection, and may not have truly applied himself to the task. At the time, a written record appeared to be sufficient, although in hindsight it was not. I discovered, in the next case, that a richer record of the participants' verbalisation of their thoughts is provided if the conversation is recorded on tape. Consequently, subsequent studies were tape-recorded. Unfortunately, by the time I had made this discovery this respondent had gone overseas so I was unable to obtain additional information from him. Therefore this Rep Grid evaluation is very weak when compared to the later studies.

The nine words chosen by the respondent to represent the decisions he faces are: Practical 2. Financial 3. Experience 4. Involves people 5. Democratic 6. Quick 7. Easy 8. Considered 9. Time dependent. These words are the elements in the Rep Grid analysis.

In the following statements the respondent differentiates between the nine elements to form four constructs; denoted by the bold lettering. After establishing the constructs the respondent weighted the elements in relation to the constructs using a one to five scale on which a score of one represents alignment with the initial pairing and a score of five represents an alignment with the alternate.

[1] 1. Practical & 2. Experienced, 3. versus: Financial.

*“The first two are **common sense**, the third is **uncertain**”*

[2] 1. Democratic & 2. Involves people, 3. versus Financial.

*“The first two are **clearly** tied together, the third is a **grey area**”*

[3] 1. Quick & 2. Easy, 3. versus: Considered.

*“The first two are **day to day** activities, the third is something that I tend to **defer**”*

[4] 1. Time dependent & 2. Involves people, 3. versus: Financial.

*“The first two are **interdependent**, the third is **independent**”*

The respondent was having difficulty thinking up additional pairs so we stopped at four iterations.

The chart below (figure 7.1) shows the nine words that the respondent selected which form the elements of the Rep Grid process, and are displayed as the vertical columns. The value response that the respondent attached to each word forms a construct in the Rep Grid, (scored on a continuum of 1 to 5 from left to right) and are the horizontal rows, with the values for each element in terms of the construct represented in vertical columns.

For example the element ‘practical’ is rated ‘one’ in terms of the construct ‘common sense/uncertainty’, where the value ‘one’ rates an element as totally ‘common sense’ and the value ‘five’ rates the element totally as an ‘uncertainty’. In the construct ‘independent/interdependent’ where the value ‘one’ rates the element as totally ‘independent’ and five rates the element as totally ‘interdependent’, the respondent has selected a value of ‘two’ to represent a less than total inclination towards the independent end of the continuum.

Display Case 1, Domain: Decision making
Context: Managerial decision making, 9 Decision types, 4 Decision determinants

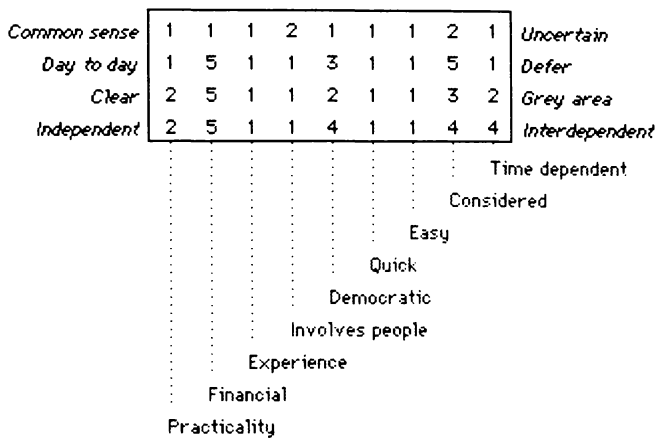


Figure 7.1 A chart representation of the elements and constructs selected by the respondent in case one. From the University of Calgary, WebGrid II.

Analysis of Rep Grid data requires a re-sorting of the data to find correlations that place similar constructs, and similar elements, together. The FOCUS computer program performed this evaluation process, known as cluster analysis. The result of the FOCUS evaluation is shown in figure 7.2. The scales to the right of the figure represent the percentage of correlation between constructs (at the top), and elements (below). [Note: To facilitate the graphical display the FOCUS program has transposed the original material.]

The FOCUS evaluation indicates that the elements 'quick', 'experienced', and 'easy' are 100% correlated, and this grouping correlates at 95% with 'involves people', which in turn correlates with 'democratic', 'time dependent', and 'practical' at just less than 90%. Finally, the elements 'financial' and 'considered' have a correlation of 75% with each other, and with the other elements overall.

The cluster analysis strongly indicates that, to the respondent, decisions based on experience are frequently quick and easy when there is nothing else to consider. When the decisions involve other people, the respondent continues to be highly confident that he can make quick and easy decisions based on his experience.

However, when other issues are introduced that are perhaps not as readily controlled, the respondent becomes more considered in his decision-making. This need for deliberation is particularly evident when financial decisions are faced. Overall, there appears to be two groupings or ‘families’ of elements; those that are closely associated with the respondent expertise, and those that are not.

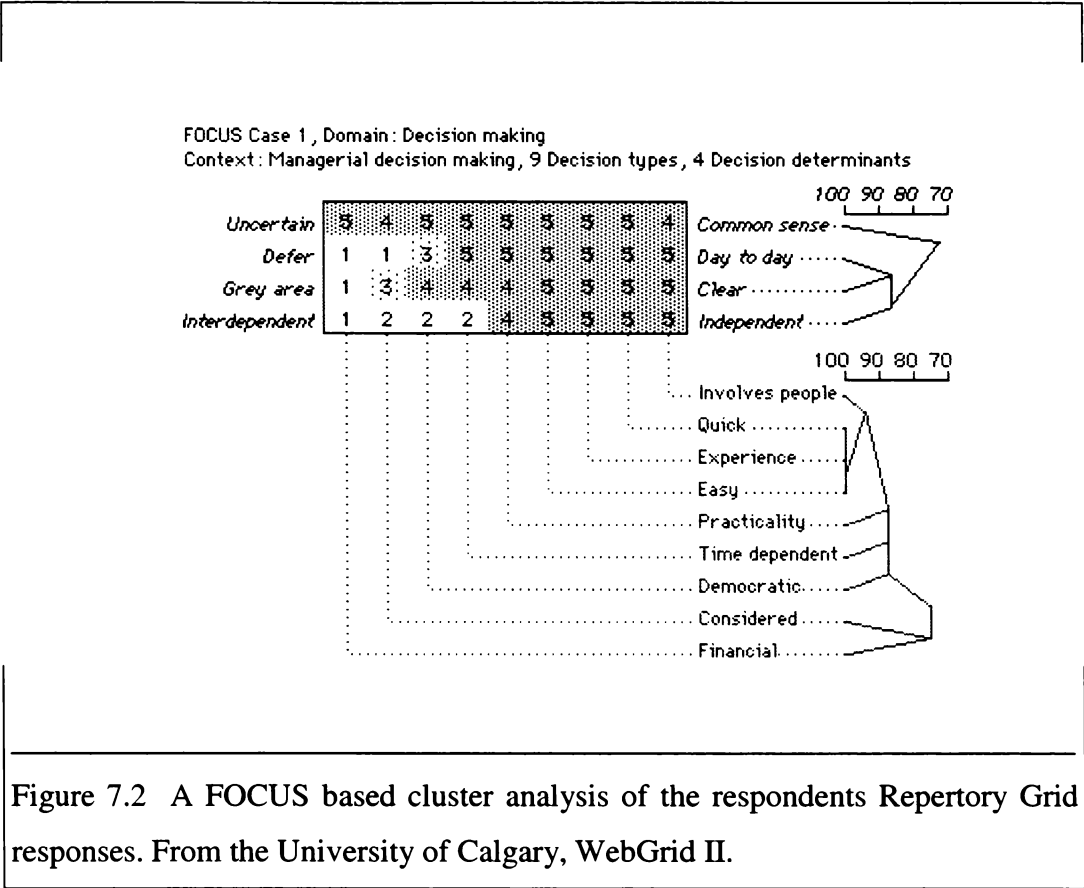


Figure 7.2 A FOCUS based cluster analysis of the respondents Repertory Grid responses. From the University of Calgary, WebGrid II.

The constructs clear/grey area, day-to-day/defer, and independent/interdependent have a correlation with each other of slightly more than 85%, and they correlate with common sense/uncertainty at slightly more than 70%.

When written in typical Grid evaluation form as follows,

- Clear – grey area
- Day-today – defer
- Independent – interdependent
- Common sense – uncertainty

it appears that the respondent has differentiated between his decision-making situations on essentially one dichotomy, easy/difficult, and that the first three

constructs are to the respondent, closely related. The result associated with the construct ‘construct common sense/uncertainty’ is perhaps an indication by the respondent that to him all the decisions that he is faced with are what he believes to be common sense. Overall the respondent appears to have indicated a strong preference for straightforward uncomplicated decision-making. However, as noted earlier the respondent was under considerable pressure from his work while he completed this test, which may have constrained his ability to develop further constructs.

Cognitive Style Analysis (CSA)

The respondent evaluated as a Wholist - Imager: WA 0.71 :VI 1.08, meaning that the respondent is left of centre on the Wholist-Analytic dimension, and right of centre on the Verbal-Imager dimension, as shown by the X in figure 7.3.

The CSA manual describes the decision-making style of Wholist-Imager as follows: This person should be able to see the whole scene and have an overall balanced perspective, particularly where success requires that several aspects need to be developed together. He is realistic, flexible and ready to adjust to the circumstances.

He is able to appreciate another person’s point of view and rarely show extremes of opinion. He is flexible and will often be happy to fit into the plans of others. He is willing to be directed and lead by others.

He is open to persuasion and is likely to change his mind fairly readily.

He has the limitation of not being very discerning and of being swayed to and fro by passing fashions. He is insufficiently critical of ideas and plans.

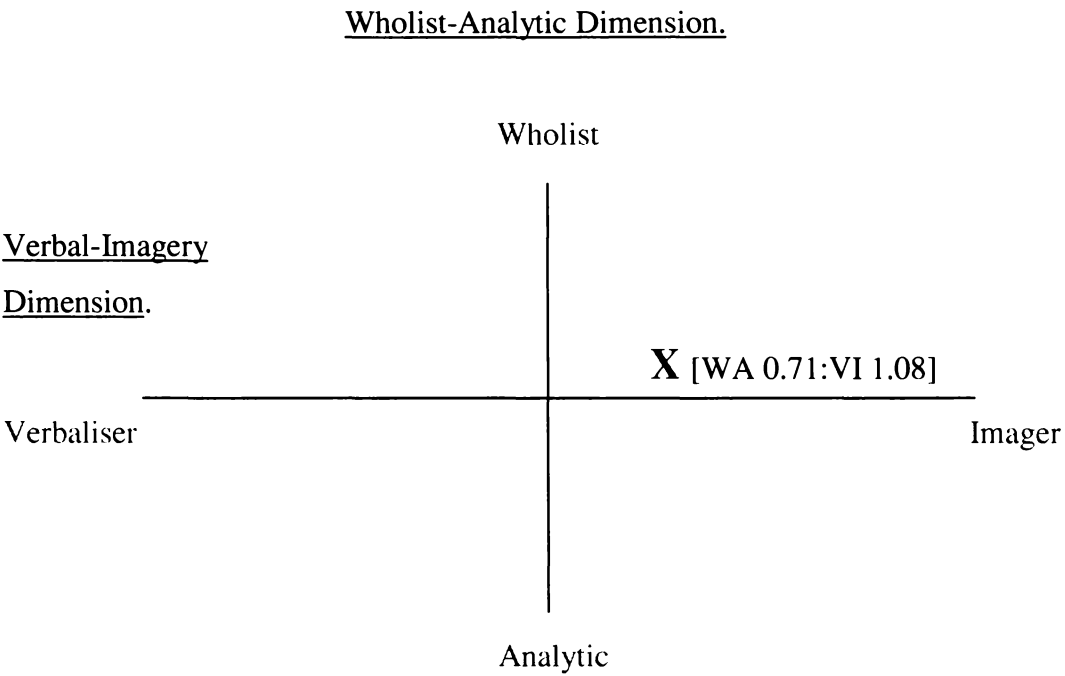


Figure 7.3 The respondents position on a global representation of all the possible cognitive styles evaluated by the CSA.

Myers-Briggs Type Indicator (MBTI)

This person provided an Extravert, Sensing, Feeling, Perception (ESFP) response to the MBTI. The following is an interpretation of the respondents ESFP response obtained from the MBTI Manual.

Extravert sensing makes the adaptable realists who good-naturedly accept and use the facts around them, whatever these are. They know what the facts are, since they notice and remember more than any other type. They know what goes on, who wants what and who doesn't. And they do not fight those facts. There is a

sort of effortless economy in the way that they deal with situations, never taking the hard way when an easier one will work.

ESFP's like to make decisions with their feelings (F) rather than their thinking. Feeling gives them tact, sympathy, interest in people, ease in handling human contacts, and may make them too easy as disciplinarians. Feeling is no help with analysis.

Case report number two.

The respondent was asked to participate in this research because of her recognised expertise within her profession. When asked she showed a keen interest in my research and volunteered to be a respondent. Data collection for this case took place in the teaching facility of a large hospital. The respondent was available for up to one hour, only on Wednesday afternoons by appointment. However, she did on several occasions phone to offer additional information which she had thought about between interviews. The respondent gave instructions to her staff that we were not to be disturbed during the interviews and evaluations. As a consequence of this instruction I was able to obtain much more information than I was in Case One.

A vignette

The respondent in this study is a New Zealand European female, age 50. This person is a qualified teacher, specialising in the education of children with special needs. She has been a teacher for thirty years, and has acquired additional university qualifications in the education of children with special needs.

The respondent is a warm friendly person who is well liked and respected within the teaching profession. She likes to be well organised, she is dedicated to her work, and she has a clear picture of what she wants to achieve.

When this study was carried out, the respondent was the senior teacher in charge of a major hospital’s education facility. The facility is both an Early Childhood Centre catering for pre-school children and a school for pupils up to the age of

fifteen years of age. Her responsibilities included the administration and management of staff, resources, finances, and the daily running of the unit. She answered to the management committee.

Interview transcripts

First transcript: A synopsis of several interviews with the respondent for this case study

The respondent’s main job function, in her words, *“is to ensure that all children receive the support of a teacher while they are in hospital. That’s my overall umbrella. It’s the kids that count. Then in terms of what I do, have to make sure that each staff member is properly supported to do their job, that their are equitable loadings in terms of case load for the day, and I would see that I have a responsibility to support the staff to do their job.”* To carry out her job she is continually liasing with other groups within the hospital system, and co-ordinating activities.

The respondent considers that decision-making is an important part of her work. In her role she must ensure that the school meets the children’s needs, which means that, she doesn’t *“have a lot of time to muck around with making a decision”*. However, *“there are some things that can take time and so I like to take a consultative role in some respects but quite often I don’t have the privilege of consultation.”*

The respondent’s decision-making is a mix of decisions relating to people, *“I’m making decisions about what would be a good thing for them to happen for that day and how can I use my knowledge of educational understanding in terms of resources and curriculum to make that happen”*, decisions relating to finance, *“what resources I use, what sort of programme I run”*, decisions relating to time

management, *“probably one of the really important things I do in terms of decision-making is about time management. I’ve got these things to do today in terms of children who always come first with me and then I will have other things that I have got to do to keep every body else smiling about this service within the hospital. So I actually have to give that some thought each day and I do that first off in the day about prioritising my day what time I’m going to give.”*

Educating children in a hospital environment is often an emotional experience, *“in this job you often have to take into account a lot of what I call emotional and psychological factors in making to decisions. They could be things associated with why a students in here in the first place, is there some issue concerning pain that s going to influence what I’m going to give them to do, or what I’m going to expect from them, or when I might be able to do it with them because of who else is going to be seeing that child. So I have to actually consult with a team of people before I can implement my belief of what should be done.”* *“Another thing is just the emotional well being of that child, because some times a kid can cope with things and other times they can’t, and how a child is emotionally may very well determine what I do with them anyway, so they may be things relating to the distance from home how, long they have been in hospital how long they are likely to be in here, what are the procedures a head of them. Another thing with children is that my decisions might be totally focused on death and dying, because the child is not going to live very long, so what I do and when I do it and what’s important is tied. I’ve got quiet a big caseload of those children at the moment. That brings me to the comment that with some of the decisions that I make I have to continue to return to myself and say, ‘am I looking after me in what I’m doing’ so that all the other decisions keep perspective and priority.”*

The most common decisions that she has to make are related to *“a child’s education programme; what is the programme meant to be doing.”* Closely followed by time management decisions. *“What I do during the day.”*

It is her view that *“a hospital teacher needs to be a person with a very solid knowledge of child development and they also have to have a very astute knowledge of curriculum,”* so that the information required for decision-making is

largely personal knowledge. *“I would carry a lot of that knowledge in my own memory of what a child does at what age in what subject so I would draw on that.”*

For decisions that fall outside her knowledge and experience, she will seek information from the child’s parents and/or the school that has taught the child prior to hospitalisation. *“There are some children that you meet and you sense that this is not the normal pattern so you can’t use your expertise. Very often a parent is available, so I might ask a question about there local school and if there is any special support given to this child. With the parents permission, I will contact the school and ask there for the individuals educational plan be made available”*. In the mean time, she relies on her *“smorgashbord of expertise and experience.”*

In this teaching environment, where many different races can be encountered, cultural etiquette is must important. It is particularly important here due to the stressed emotional state of patients and parents. *“One of the things that I have done in previous years in terms of my own professional development is to actually identify the different groups that we get here and to actually make sure that I am aware of some things like greetings and definite no no’s with in that culture so that I don’t offend them.”*

The respondent states that most of her decisions, *“whether it is educational, financial, or whatever,”* are based on her *“expertise, which is my historical kind of perspective of the matter, and the current situation.”* If time permits she will often discuss decisions with her staff, *“particularly if it has a complexity about it or a risk to it and it can wait, I would wait until I talk with my colleagues. That just ensures a good outcome really, it is not very often that I will change what I have already decided to do by consulting with others, but some times I do and I’m very willing to take advise.”*

The respondent is comfortable making quick decisions where her expertise provides suitable solutions, for example, *“if it’s about a child’s teaching programme then I would have no problem making that decision I would use my*

expertise, my case load of the day, and I would make the decision. That would be how I would prefer to do it and that's how I would do." However, *"it if it was for something that was going to have a long term consequence then my preferred way of making it would be that I, perhaps had more time to make the decision and more opportunity to consult. So that the consequence of that decision was going to be most supportive to the child initially, possibly the family, and at times my safety and when I say that I would see those as the hooks. I'm thinking were there are times when I'm actually asked to make decision by a paediatrician, or asked my opinion about something and I would usually ask when are you wanting that decision. And if he says I want it today then I might have to negotiate that. If he says I don't need it for a week, then I'll say I'll keep looking at it and make a recommendation, or I'll gather some observation notes and write a report. But things can often involve CYPS [Children and Young Person Service] here, and if it involves a legal kind of consequence then I think its important to consult. I also find that in making decisions for families, or being involved in decisions for children that are dying, that requires a different process and I would have some preferences about that."*

The respondent's reference to her own safety shows concern to avoid recriminations and to avoid *"feelings on my own part that I haven't actually given the kids the best for a situation. I don't easily cope with compromise. Quality is very important to me, and I am not a person who chews over a thing for a long time to make a decision as a rule, but I believe that there are some times when you do need to."*

This person's expertise is the base on which most of her decisions are made, but she strongly believes that her personal makeup determines how she works. *"How I work are things about me, but what I do with children is definitely based on my curriculum expertise, what I make most use of would be my post grad training. That was much more about teams, interdisciplinary and multidisciplinary functions, and once again that's a content knowledge that I bring rather than a process. Overall I would say the way I do things is about me, rather than what anybody has put in me, what any formal education has put in me. In terms of courses I mean, I haven't gone to course on decision-making techniques, or that*

sort of thing. I think my father would have been a very powerful influence on who I am and how I do things.” For many years her father was Mayor of her hometown.

When asked if her managerial role had necessitated any modifications in her decision-making style, she replied that she is not aware of having a particular style. *“I think I approach things in different ways according to what the circumstances are, but I suppose if you were to put that out into a flow chart it would have its own little cycles to it any way.”* However, when asked if she would treat management decisions in the same way she deals with educational decisions she replied, *“No I don’t think I do, I mean I don’t have a great deal of knowledge about management systems, so I suppose in a sense it depends how you argue it. What a child learns is a systematic approach to the building of knowledge, and I guess what I do in terms of managing and administering this unit is to assist it through.”*

Second transcript: An interview with a work associate

This person is a teacher at the hospital, who answers to the respondent who features in this case study. She would seek help from the respondent in situations where she needs *“advice, advice on anything that I didn’t feel I had the knowledge of during the day or to do with the children who I see.”*

In the view of this teacher, she and the respondent often confer when making decisions. *“We make decisions quite often to do with the unit and our management of things together, in our staff meetings week by week we do make decisions about the unit, and we make decisions about follow up for children who are admitted to the hospital, so that’s the type of decision-making we would be involved in.”*

When asked to describe the respondent’s decision-making style, she stated, *“She is a person who gives great thought to any decisions that she makes. I think that*

when you have a problem you can see her thinking before she gives you an answer, but she will give you an answer fairly promptly, but it never really finishes there. She knows that if its a problem you have, that she can come back with more options, or if that first option is one that doesn't really suit you she's always very prepared to follow up. I think that her decision-making in this situation really is as a result of having known people and taught in various situations including this situation for a great deal of time. So its one of pretty huge experience really."

She considers that the respondent's decision-making strength lies in an ability to *"find a lot of solutions. She doesn't just find one and stick to that she thinks quite divergently about all other options to do with the situation. And if isn't perhaps as she's perceived it she can come back with more options. So I guess it's a divergent decision maker she doesn't stick to one idea unless it's the one that's working."*

When asked if there is any type of decision that the respondent has difficulty with, she replied that *"I don't think she rushes to make decisions, although she could give you an answer very quickly, I think it stays with her for a long time. But I don't actually think that's giving her a difficulty; except that she gives it an awful lot of consideration. She's quick with an answer, but she doesn't always leave that decision alone it stays with her and she wonders herself, if she has given you the right decision. I think she particularly finds decision-making difficult if it s going to hurt or upset a person or child, then its difficult for her if she has to make a decision against those feelings. She is a very humanitarian type of decision maker, she likes to be comfortable with her decisions, but that doesn't stop her from making a decision against her feelings if she sees fit."*

In managerial decision-making, this person considers the respondent to be *"very strong, which as I say affects people, I think she is very organised and has a very advance and futuristic view of what she wants to achieve in the way of management of a place or of a building or of a unit for example and I think she has almost a drive for what she wants and she goes for that very quickly."*

In her view there is a difference between the respondents managerial and educational decision-making, when people are not involved. *“If she’s managing people perhaps not but I think her decision-making style when its not a human, like when it’s a management of buildings, or of resources, or things that aren’t human is, yes, probably done much more definitely than ones that she has to make about people.”*

A strong characteristic of the respondent’s decision-making, in this person’s view, is determination. *“One thing you can see in her when she has made a decision that its something that she wants to stick to, she’s pretty firm and strong in the decisions she makes, I think.”*

As this person’s supervisor, she sees the respondent as *“extremely efficient but I would also say she is very human and very caring person.”*

At the conclusion of the interview this person stated that she would have liked a bit of time to think about some of the questions before she answered them. She added, *“When your speaking about management, and (the respondent) as a manager, I see her very specifically in two different roles. One is that she manages the people in a place that she comes across, not only the people she is responsible for, but also the people she has around her and the children, and I think that style of management is quite different to her management of, I think as I said, money or resources or the unit. So in that I think I was trying to say that I see it as two quite distinct styles, or perhaps she still has that feeling for what she wants from people but she just approaches it in a different way. So in all your questions when you talked about her approach to management decisions I felt a bit of a split, because if its to do with management or to do with people she is in a different a place. OK.”*

Third transcript: A work associate of the respondent

This person is a ward receptionist on the children’s ward. She has frequent interaction with the respondent *“to let her know where there are any social problems with the child, also to inform her about any complications going on in*

the children's lives that she may has not been able to pick up in the short time she stays with them, compared with the longer time that we get." In her view the respondent is able to offer "so much more with a better understanding of the children."

This person states that the respondent makes quick and appropriate decisions, and is able to adjust her actions to suit changes in the situation. *"She is always able to assess the child very quickly and then decide which is the best way to go with the child's education whether to back off a little bit or to go ahead."*

When asked if there are decisions that the respondent is particularly good at or has difficulty with she replied that the respondent *"is a good all rounder, she is so skilled. She's a very logical person and its what ever is best for the child, that is what she pushes for."* In this person's view there is no difference between the educational decisions and the managerial decisions made by the respondent. *"Again she is very skilled at achieving the best with the child, or with the whole service, the bottom line in her case is the child. Every thing is best for the child. She stated that the respondents decision-making style is that of, "A kind loving person very caring person."*

Fourth transcript: Interview with a colleague

This person has known the respondent for more than twenty years. Early in the respondent's career this person was, for six years, the respondent's supervisor. Since then they have been closely associated as teaching colleagues. The respondent is in this person's view *"determined, political, friendly, independent, dedicated to the job, willing to give of herself to achieve her goals. She is organised in all aspects of her life, likes to be tidy and in control. Also, she can be a strong advocate if she feels the need, takes advantage of a situation if she sees it could be beneficial for either herself or the goals which she has set in the job. She has a strong set of priorities, is ambitious, easy to talk to, enjoys recognition, a*

leader, sees goals clearly, and likes to encourage people to use their potential and have faith in themselves.”

Observations

The respondent gave an impression of a person who is driven by her desire to achieve self-imposed goals. She is a very friendly, warm person who is easy to talk with and she was very willing to talk about her background and her aspirations. Her strong personality is immediately evident and clearly shapes her management processes.

Her decision-making appears to be mostly intuitive, based on personal evaluation of the problems she faces. She communicates openly with her own staff and with other people outside her managerial control, and readily uses feedback to monitor situations.

The respondent is politically astute and appears to clearly recognise the path to her objectives.

Psychological evaluations

Repertory Grid Technique

Note. I collected the initial data by writing answers on paper, as I had done with the first case study, but the respondent was talking far too fast for me to make a meaningful written record. I was not satisfied with this outcome. I was aware that I had missed a large part of the information provided by the respondent, so I returned and asked her to talk through the same selection while I recorded her conversation on tape. In her comments she repeated the same comments that I had

managed to write down, but the recording provided far more information. I used a taped record for subsequent data collecting in this case and the two that follow.

The 9 from 17 decision types selected by the respondent were:

1. Considered. 2. Based on practicality. 3. Based on experience. 4. Analytical. 5. Intuitive. 6. Based on knowledge. 7. Involving people. 8. Financial. 9. Time dependent.

The groupings made by the respondent were:

[1] 1. Based on knowledge 2. Based on experience, versus 3. Intuitive.

“Similarity about based on knowledge and based on experience is that you do have some prior learning. Something has preceded that for you in terms of your having had some experience a prior learning really which you bring to a situation. And intuitive, to my way of thinking is more of a feeling response that is more sort of gut level. So one has got a sort of fact, actuality base and the other one is more sort of going on your feelings, which it could be argued has prior learning anyway but for the purpose of the grouping I chose to do it that way.”

[2] 1. Involving people 2. Considered, versus 3. Time dependent.

“Well the time dependent side of it for me intimates an aspect of measurement or a finiteness that it is something that has a start and finish and that could be quite different to something needing consideration because if there are people involved it usually is something that requires a gathering of certain information understanding historical background which can very often blow about this finite aspect of time so one is almost in contention with the other.” Q. What do you see as the similarity between considered and involving people? *“That consideration for me involves reflection and time in a way that has to give a proper decision it involves not having a finite time to it, it needs reflection and pondering thinking and taking into account which is different to the aspect of finiteness or time dependent, this is open-ended where as that is very much closed the time*

dependent is closed where as a considered is an open time.” Q. And because it’s involving people you think it should be a considered decision? “Yes.”

[3] 1. Analytical 2. Based on practicality, versus 3. Financial.

“I would see the analytical and based on practicality as going together in so far as that what ever it was that you were being asked to decide upon you are actually thinking through all of the aspects taking into account the practical elements and that should be able to stand alone, oh no its not that it should be able to, but it would be a privileged to think that a decision could be made analysing the facts and it’s practical applications independent of any financial reasoning and I guess I’m bringing my prior learning of restraint financially because usually it is that in my experience of decision-making that finance is very much a finite (factor?). And I would like to think that there is the opportunity to make practical decisions that were workable without financial restraint of finance.”

[4] 1. Time dependent 2. Financial, versus 3. Involving people.

“Once again time dependent and financial are something that have usually got a measurement to them which has amount side limit top it in making decisions in terms of there are only so many hours in the day or there is only a certain amount of time to come up with a decision and that, that decision I also couched in the finical implications of that decision where as what people actually require might fall quite outside of that in terms of assessing the situation or delivering what is required or the ongoing re-sourcing of what ever that decision might involve. So once again one is seen as a restraint and that other one has got open to do it well should be able to stand alone of the restraint of time and money” Q. So you need a wider scope. “Yes.”

[5] 1. Analytical 2. Based on experience, versus 3. Financial.

“Well in making a decision I believe that I would always bring my prior learning to that situation and I would always encompass aspects off other things I’ve come across in experience of making a decision and that I would analyse the factors out

of those experiences so that they would be working together in making the decision and that would stand alone the things that I'm doing in terms of ding that would stand quite alone in a very general sense from a money question in so far as once again I would see that the financial aspect might offer restraint to information I had analysed out of my other experience."

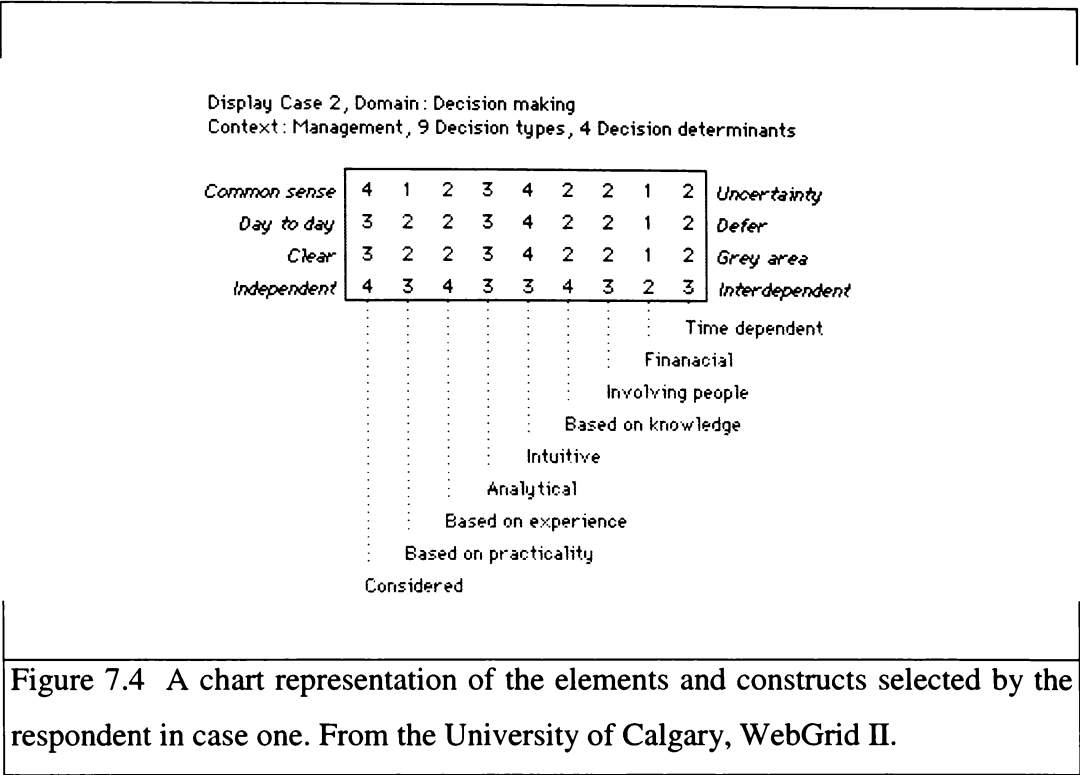
[6] 1. Based on practicality 2. Considered, versus 3. Time dependent.

"I think one of the things I am heavily biased to is the practicality of the decision because that's the way I am and so therefore in making a decision based on practicality I would be thinking about it's workability and I would think that the fact that it had been thought to be workable and practical was independent of the fact that time something because I don't think time should in actual fact dictate whether or not something should go ahead if it's been considered and felt to be practical I mean if it takes a bit longer to get there it may in fact have a much better long term outcome for the person or the situation."

The chart below (figure 7.4) shows the nine words that the respondent selected, and these form the elements of the Rep Grid process, which are displayed as the vertical columns. The value response that the respondent attached to each word forms a construct in the Rep Grid, and they are the horizontal columns.

Analysis of Rep Grid data requires a re-sorting of the data to find correlations that place similar constructs, and similar elements, together. The FOCUS computer program performed this evaluation process, known as cluster analysis. The result of the FOCUS evaluation is shown in figure 7.5.

The Focus evaluation indicates that the elements 'based on knowledge' and 'based on experience' correlate at 100%, and in turn correlate with based on 'practicality' and 'involving people' at 95%. The elements 'considered' and 'intuitive' correlate at 90% and there is an overall correlation between all elements including 'financial' at slightly higher than 80%.



The cluster analysis indicates that the respondent considers her experience and knowledge to be essentially the same thing in the context of decision-making. The respondent also indicates a close alignment between decisions that are based on practicality and those decisions that involve people, and these decisions elements are closely associated with her knowledge and experience. The respondent apparently regards intuitive decisions to be similar to considered decisions.

The construct analysis shows a correlation of slightly less than 100% between ‘uncertainty/common sense’ and ‘grey area/clear’, and between those constructs and the construct ‘defer/day to day’ there is a correlation of slightly more tan 90%. The construct interdependent/independent is less closely associated with the other constructs at a correlation of less than 85%.

The constructs used in this respondent’s Rep Grid are those defined by the respondent in Case One, therefore I am unable to analyse her choice of constructs, only her weighting of the elements that she selected, within those constructs.

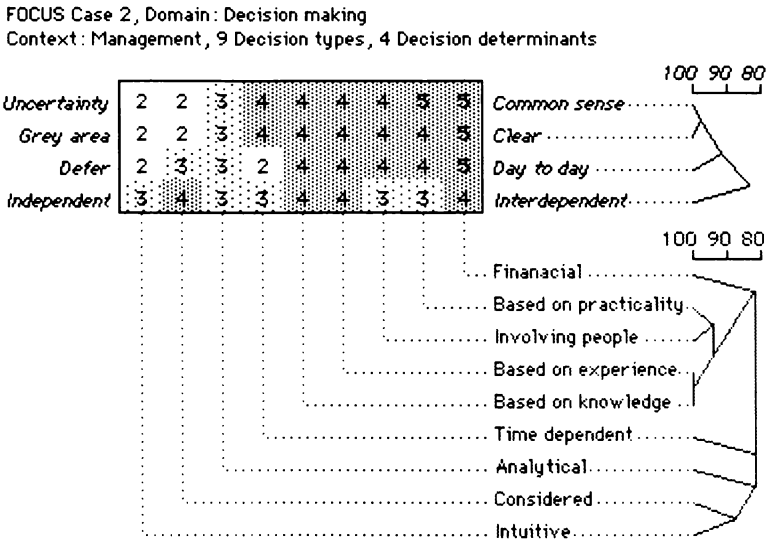


Figure 7.5 FOCUS evaluation of the respondents Repertory Grid response. From the University of Calgary, WebGrid II.

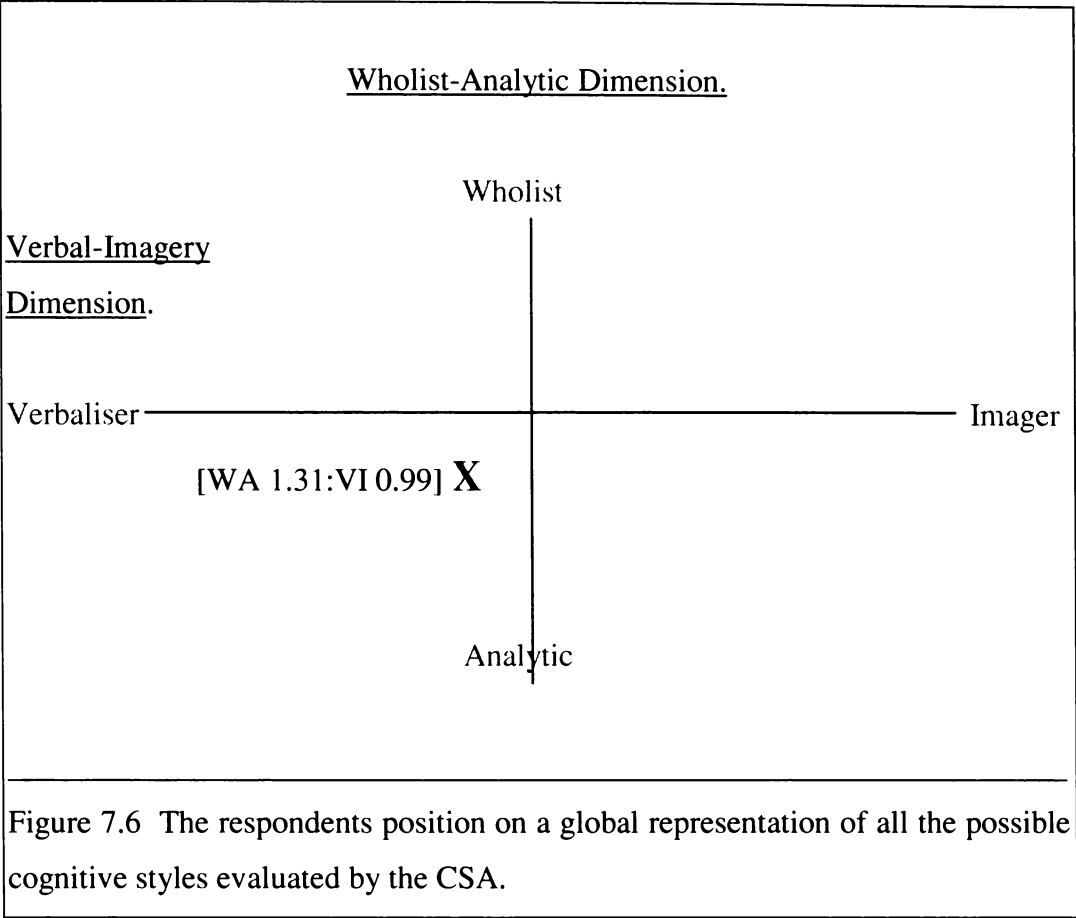
Cognitive Style Analysis (CSA)

The respondent evaluated as an Analytic-Verbaliser: WA 1.31 VI 0.99. This evaluation places the respondent right of centre on the Wholist-Analytic dimension, and left of centre on the Verbal-Imager dimension as shown by the X in figure 7.6.

The CSA manual describes the decision-making style of an Analytic-Imager as follows:

This person should be good at analysing situations and obtaining a clear view of the important issues when considering problems or plans and the best way of doing things.

Because this person can often appreciate a range of options and have a desire to examine and weigh up the pros and cons she is sometimes hesitant in making decisions.



This person is likely to be consistent, but the negative side of this will be a slight inclination to rigidity and stubbornness. She is likely to be idealistic and inclined to follow a set of principles. However, she will usually be socially realistic in terms of what others are likely to accept.

In planning situations where new ideas have to be found she is likely to make the greatest contribution in the area of how plans might be implemented rather than in their generation.

Myers-Briggs type Indicator (MBTI)

This person provided an Introverted, Sensing, Thinking, Judging (ISTJ) response to the MBTI. The following is an interpretation of the respondents ISTJ response obtained from the MBTI Manual:

Introverted sensing types are made particularly dependable by their combination of preferences. They use their favourite process sensing, in their inner life, and base their ideas on a deep, solid accumulation of stored impressions, which gives them some pretty unshakeable ideas. Then they use their preferred kind of judgement, thinking or feeling, to run their outer life. Thus they have complete, realistic, practical respect both for the facts and for whatever these facts create. Sensing provides the facts. And after the introvert's characteristic pause for reflection, their judgement accepts the responsibilities.

With feeling as an auxiliary they mildly resemble the extraverted feeling types. Feeling stresses loyalty, consideration and the common welfare. They are sympathetic, tactful, kind and genuinely concerned, which traits make them very supportive to persons in need of support. They are often attracted to fields where systematic attention to detail is combined with a care for people, as in the health professions.

Case report number three

I arranged to meet with the respondent to discuss my research and to ask if he would be willing to participate. The respondent showed an interest in my research and agreed to take part. All subsequent meetings were arranged through the respondent's personal assistant, and took place in the respondent's office.

A vignette

The respondent in this study is a New Zealand European male, age 40.

The following biographical details are drawn from the responses to a short questionnaire, which the respondent completed prior to the interviews.

He is a biologist with a PhD in soil science and microbiology. He has research experience in New Zealand and the United States of America, where he did post-doctorate research, and later lectured as a visiting professor. His publications include approximately 85 scientific publications and refereed journals, and 45 consultancy reports. He has 13 years experience as a research scientist and is considered to be an expert in his field.

The respondent has been working in a managerial capacity for more than three years. He is a regional manager for a research institute that has a total staff complement in excess of 120 people. Since becoming a manager he has undertaken specialised management training aimed at his particular needs in the current management position. The courses taken include accounting for non-

accountants, managing and leading technical people, and a technology management programme at the University of Waikato.

When first appointed to the management position he continued to be personally involved in scientific research, but soon found that the managerial role did not allow sufficient time, so he is no longer directly associated with scientific research. However, his management role is heavily dependent on his understanding of scientific research and what it is to be a scientist.

Before starting my PhD research, I worked at the research institute as a research assistant for approximately 12 months. During that time the respondent became the regional manager of the institute. Prior to his promotion he was the research Project Leader for the section of the institute in which I worked. Consequently I met him frequently and formed my impressions of him well before this case study took place. The respondent also helped me to complete an earlier case study evaluation of the research institute in which he is the regional manager.

To me he is a quiet, but not a shy person, who works hard to pursue his interests, and displays strong personal confidence. He admits to being consumed by his research to the extent that he had little interest in other people. However, he chose to move into management because it offered new challenges, and as he mentions in the interview transcripts that follow, he has had to change to achieve the goals of his new management role. He enjoys a joke and is an interesting, and easy person to talk with. During the interviews he was relaxed and offered valuable insights to his managerial role, and to his efforts to come to terms with the position. He has always shown an interest in my research, and he has been a very co-operative respondent for this case study.

The respondent gives the impression that he is an easygoing friendly person. He appears to be a quiet thinker who decided to pursue a management position because the opportunity was presented. He also appears to be content with his present position. During our meetings he was relaxed and confident. The respondent expressed an interest in my research, and was willing to explore my questions in some depth. He often supplied analogies to clarify what he was

saying. There did not appear to be any difficulty understanding one another, and the formal questions were only necessary as guides for the conversation.

Interview transcripts

First transcript: A synopsis of several interviews with the respondent

The respondent continues to be involved in research in an advisory capacity. He no longer acts as a project leader, nor does he have his own research program. Decision-making, in his managerial capacity, is a major function. He faces decisions related to financial matters associated with budgets, existing and new projects, and securing research funding. He also has to make decisions as part of his management of the staff that report directly to him; the Business Development Manager, the Regional Accountant, the IT Manager, and eight Project Directors. Decisions are related to recruitment of scientists and senior staff, salaries and performance evaluations, and directing the progresses of work. He also makes decisions about what kind of research is appropriate for the organisation.

His managerial decisions are constrained by the Research Foundation's research strategies. The direction that the organisation is obliged to follow is largely dictated by availability of funds. No matter how valuable the scientists may consider a project to be, it will not proceed without funding. He is forced to make the decisions in this area because the scientists tend not to accept the constraints, requiring the respondent to make decisions on their behalf.

The respondent states that decision-making is an important part of his job, and as stated earlier, it is a major part of the job. The most common decisions are financial, but the respondent considers that the most important decisions are those related to people. *"The reason being that in this business we sell peoples' time."*

That's how we make our money, from the expertise of those people. We have got to have them motivated and with good morale. They need to know where they are going and feel secure. So if we haven't got that, then none of the financial things work."

It is unlikely that any single decision will lead to adverse consequences. The respondent considers that it would require a series of inappropriate decisions to cause major problems. The possible consequences associated with inappropriate decisions are high staff turnover, financial blow blowouts, and disasters. *"I think you balance the way you make decisions based upon the consequences, the significance. And the consequence whether you make that decision solely, or a consultative approach, or truly consultative. I don't know if that's the right word, but truly joint with others, or if you do it on the basis of listening to others and feeding that into you and tossing it around and coming out with the answer. So there is all sorts of levels."*

Decisions that require consideration of the organisations needs and conflicting needs of staff are stressful for the respondent. *"There have been a few situations like that and it does churn me up. But at the end of the day the organisation is paying the bills for me and for the other person. And if those decisions are going to impact negatively on the other person, I really have gone through it and tried to think of other ways of doing it. Then at the end of the day it's the organisation that comes first."* Acknowledging that many of his staff have huge personal investments in very narrow fields, the respondent stated that he gets some compensation - *"if you like can make me feel better about those things' – from knowing that those people usually have not got a good fit with the organisation and they are causing of stress and problems for a lot of other people. "So you are sort of making some peoples lives easier if you deal with it".*

The respondent claims that he usually seeks input from the people who are closest to a situation to get their perspective on a situation *"then I make the decision"*. However, he states that his decision-making style varies. *"When the decisions are minor I'm autocratic because I've got to get on and do the job. So, 'bang', that's OK. Go for it."* He added that, *"Also, you know there is another tier of decision-*

making where, when you really look at it might not matter what decision is arrived at, as to how successful the decision is going to be, but how the it is arrived at.” As an example, he referred to a situation where he may require a change in the organisations structure. Although he requires a change, he is not really interested in the structure so long as it delivers the desired result. *“I think it’s more likely to deliver what I want if the people who are going to be affected come up with their own organisation structure”*. In that kind of situation he does not see a need to be a decision maker. He considers that he just endorses the decisions made by the group. As he states it, *“is not to sort of impose, or be autocratic, or even democratic about, it’s where people make their mind up. So that’s another sort of type”*. This appears to be more a guiding and facilitating role.

By inclination the respondent is an autocratic decision maker. He stated that *“you could call that genetic inherited, I would be autocratic, and I think that comes with a lot of people who end up in management roles. The reason that they end up in management roles is that when they are not in management roles they have been confident people. Confident in their own ability, and have therefore made their own decisions and taken on responsibilities for their own decisions, and that’s why they have come to the management situation. They have displayed characteristics. And so I would have to say in those times I would be autocratic so I would sit down and say ok I reckon that to research this issue we have to do this and we’d do it so I’d say that would be my natural way autocratic. So I do constantly do a check on myself, just in my head, what things have I done in the last week how have I come to those decisions am I slipping back to my natural autocratic way, but I think that autocracy if you like can be sort of beaten out of you, not beaten out of you, but it sort of you see that it’s not appropriate. I guess that’s just experience I suppose but you see that it’s not an appropriate way to do things.”*

Since becoming a manager the respondent has had to modify his approach to decision-making. He is now aware that his dependent on the actions of others to achieve his objectives. As he states, *“Yes, you have to rely on others, you do have to rely on others and that’s something that I’m very convinced of. I don’t want to*

become an accountant; I just want the accountant to give me something and to recommend something to me. You know, I don't want to become an expert in IT, I just rely on the IT guy to tell me what he thinks is the best course and why he thinks that".

As a manager he must rely on others to provide information necessary for decision-making processes, unlike when, as an expert in his field he had all the information at hand. *"There is a fair amount of that I mean there was some time I guess back in the scientist days. There you know its like there may be an issue that comes up and there might be three or four different people who could claim expertise in that area. And I guess I would say they don't know what they are talking about you know scientific arguments between scientists. You know what you are talking about. This is the way to go. You are going to waste a lot of time and not come up with the right kind of answers doing it your way. That sort of thing."* Now as a manager, he intentionally does not "do" some of the "business things". He stated that when he meets people they often ask how he, as a scientist, can run a business, *"I you haven't got any sort of management or accounting background"*. His reply is that *"I say well our business is science and I rely on others. I rely on the recruitment process to get me good people."* After a brief discussion about the high proportion of accountants in New Zealand businesses compared with the United States, he referred to the criteria being put forward by the Foresight Project (a funding agency). They are saying that *"if we want to be a knowledge based society we have got to get some of the technocrats, some of the technical expertise into positions of influence."*

Although the respondent recognises that his expertise helps with the technical aspects of his managerial decision-making, such as what he is making decisions on, he does not see that his expertise provides any benefit in the actual process of decision-making. However, he does admit that there is *"to some degree there is a common thread running through, in that the scientist has by training an analytical mind, tries to be quantitative, objective about things. Where as somebody coming from, another discipline may be less analytical more subjective. So I think there is that analytical training that comes through from science that may be runs through in your decision-making. Ok, when I make a decision on some think, if there are*

any numbers, or figures, or quantifiable things, I'll get them before I make a decision, because I feel comfortable with quantifiable things."

The respondent agrees that in becoming a scientist he apparently chose a career that suited his inclination towards being analytical. He also recognises that in assuming a new role as a manager he has had to modify his decision-making style, and that the new style is not his natural way of making decisions.

Second transcript: An interview with a work associate

This person has known the respondent for many years. He is a research scientist, and Project Leader within the organisation managed by the respondent. He and the respondent worked in the same research field before the respondent became the Regional Manger.

He stated that the respondent has an open door policy, which permits either person to contact the other as necessary. He identified two different decision-making processes the he and the respondent can be involved in. First, if the issue is straight forward *"In these any one who is involved in the situation will come along to express there concerns in a group situation and then a consensus will be reached. Alternatively in the event that the issue is more complex than that, either party will go away and give some thought to the various options, put them in writing so that they can be circulated to the other people involved in the decision-making. So that they can have time to think about it and the options and then to discuss it and reach a consensus."*

When asked to describe the respondent's decision-making style, he made the following comments. *"It ranges from quite definitive. Quite autocratic, in a way where the issue is clear, cut and dried, it's not really open to debate. There is no real belief that it is necessary to debate because the issue is black and white and this will or will not be the way to do it. Through to the other extreme where there is absolutely no clear thought as to what the final outcome might be, therefore there is no precise decision-making taking place at that time. Its just really a case*

of how do you think, what are your thoughts, or we have to come back and discuss it further, what are the issues.” He agreed that the respondent has cope with quite a wide range of decision-making situations, and added that he has “seen both styles both extremes operating”.

To this person, the respondent is *“particularly good at going away and thinking about the issues and in his own way in his own quiet time to find what the issues and options are and to put forward a recommendation base for the decision.”*

He was unable to identify specific situations in which the respondent may have difficulty with the decision-making process. As he stated, it is hard to judge *“whether he has difficulties with it or whether it is simply a difficult decision-making situation frequently there are conflicting views in many cases and there isn’t a clear distinction or advantage from one or the other.”*

When asked if, in his view, the respondent appeared to be more at ease with decisions involving people, things or processes, he stated, *“probably dealing with things and processes. I think when you get involved in things that involve personalities it does create a more sensitive situation because he is a sensitive kind of decision-making person, it increases the degree of difficulty in the decision-making.”*

He was asked to consider the two elements that makeup the respondent’s managerial decision-making background, a scientist and as a manager, and to comment on there affect on the respondent’s approach to management decisions. He stated that *“I feel that initially when he first ended up in that job he is/was bordering on embarrassment because he came from a background of familiarity with colleagues and I think he found it a bit difficult to be seen and accepted as some one who had to make the kind of decisions that affected his colleagues. I think he is more comfortable about that now.”* He considered that he no longer works closely enough to the respondent to comment on the any difference between the respondents decision-making style in his area of expertise and his decision-making style as a manager, *“except to say that I believe his style is very much dependent on his personality irrespectively.”*

In this persons view the respondent is not of the old style of managers who “*were seen as stern loud speaking table thumping decision makers. Where it was seen almost appropriate or necessary to be sort of quite bolshie in the way you managed people and issues. To be seen, as a leader, to be unafraid, to be unpopular, unafraid to stand up and say what you thought. Where strength of personality was a manger feature*”. He is, in this person’s opinion, a modern type of manager. “*The flavour of the time is for one of moderation, much more sort of personable, much more sort of responsive to issues and sensitivities of the role.*”

Although the person interviewed agreed to our meeting, he was not at all at ease while the tape recorder was recording our conversation. Perhaps in recognition of this he sent an e-mail, two hours after the interview. The e-mail contains what he called “*Just an after-thought that may be of some use*”. It is in fact valuable additional comment, which provides an important insight to the respondents personality and decision-making processes.

“*In my opinion ‘respondent’ does not always come across as an articulate, quick thinking, fast talking manager. There can be long awkward moments as the right words or response may be sought. This is most apparent when dealing with new topics/issues etc. His body language projects a level discomfort, while at the same time clearly expressing intelligence and an astuteness that wheels are spinning in many directions, but they are not yet synchronised into a uniform consistent or appropriate response. Once any issue has been reflected upon, both the written and spoken response tends be very perceptive, clear and confident. One further comment, I feel he has mastered the art of listening to good effect and knows how to utilise silence, and an almost quizzical appearance of participation without really saying anything at all, in order to keep people talking even potentially beyond their comfort zone.*”

Third transcript: An interview with a work associate

This person had, at the time of the interview, known the respondent as a work associate for two years. She is a chartered accountant employed as the Regional Accountant for the organisation. Her position as Regional Accountant answers directly to the Regional Manager, the respondent, consequently she works closely with him. They not only have numerous meetings due to the relationship between their positions within the organisation but, as senior people within the organisation they frequently attend other meetings together, both internal and external to the organisation. Also, as she stated, *“I drop in his office when ever I want to ask him something, sort of thing.”*

As could be expected, the respondent and the Regional Accountant are involved in decisions involving expenditure, particularly capital expenditure. The Regional Accountant also has responsibility for health and safety issues, and the organisation’s property. These additional responsibilities create additional decision-making situations in which both the respondent and the Regional Accountant may be involved.

This person sees the respondent’s decision-making style as considered and deliberate. She states that he is *“quite slow off the mark, you know like he thinks a lot before he opens his mouth, or asks about clarification or that sort of thing. He tries to compare it to something else often, you know like what else would this relate to, like what else do we do that this can sort of sits along side that we can base our decision on.”* However, the respondent prefers not to work to guide lines, *“he hates guide lines. He hates the idea of guide lines because things always fall outside them see, so you can’t write every option down because things are always going to be on either side.”* Nonetheless, he always looks for precedents. Either a precedent that indicates, *“what have we done to date”*, or *“what sort of precedent is this going to create”*.

From this person’s perspective the respondent is able to make quick, firm ‘no’ decisions, which she finds very helpful in her position. As she states, *“I can go in there and say this is what I think. What do you think? And he’ll say nah”*. She

indicates that she “*would sort of ponder on it for a bit longer, or waver a bit*” so the respondent’s ability to make negative decisions helps to take the emotion out of the situation, at least for her, and gives her strong feedback about what should be done.

In this person’s view the respondent’s science background is often very helpful in decision-making situations. As she states, “*he is quite handy in terms of science things, because he knows. You know, he knows what the background is to the question ... where as I wouldn’t.*” However, she was unable to say what decisions he finds difficult. She commented that the respondent’s approach to managerial decision-making is “*considered, Sort of structured in terms of looking at all the options, em. And consultative where sort of necessary*”.

This person, because she has only known the respondent as a manger, was unable to say whether the respondent’s decision-making style as a manager differed from that when he was a research scientist. She commented that his decision-making style, in her view, is characterised by his straightforward attitude, what she called “*straight up, sort of shooting from the hip*”. Additionally she stated, “*There is quite a lot of sense of humour involved in his work. So there is a sort of easy style about what he does and how he goes about it. I think that characterises him and also the science, you know, having the science background, you know, having all that information and that sort of thing*”.

In the view of this person the respondent is analytical, he tends to think things through and work out possible solutions for a decision, rather than make intuitive decisions. However he is also a people person. She finds him to be “*sociable, easy going, goes down to the tea room, keeps his connections with scientists, em, and those things are quite valued.*”

Observations

In my view the respondent prefers decisions that are, to him intuitive. He likes to be able to draw on previous experience and make quick decisions that do not involve other people. However, he accepts that as a manager he faces many situations that cannot be resolved by intuitive decisions. He is well aware of the need to consult with people who may be better informed about the decision topic. He also considers the people involved in decisions. The respondent is very sensitive of the need to consult with staff and to ensure that, where appropriate, the members of staff are allowed to own the decision.

My overall impression is that the respondent is using his analytical ability to assess the needs of his new position and where his assessment indicates a need; he is working strongly to develop his decision-making processes to fit. Although he is no longer working as a research scientist, his analytical expertise is being strongly utilised, as is his ability to make intuitive decisions based on his prior experience.

Psychological evaluations

Repertory Grid Technique

The following are the nine words selected, as most representative of the decisions faced, by the respondent.

1. Involving people. 2. Democratic. 3. Instant. 4. Based on experience. 5. Based on practicality. 6. Based on knowledge. 7. Financial. 8. Analytical. 9. Autocratic.

The following are the respondent's verbal responses to the structured interview process that forms the data collection part of the Rep. Grid.

[1] 1. Based on knowledge & 2. Based on experience, versus 3. Instant.

"Because ones knowledge whether it's your own knowledge or others is based on experience there is a strong link between the two, knowledge base is what you are starting from." "Definitely linked."

"Instant is sort of opposite but its not, there are instances when you do have to make instant gut feeling reaction to what somebody is saying to you across the table or whatever and so your not going through the process of building on your knowledge or your experience yet at the same time, if you think about it long enough, that instant response is probably driven - the way that you respond instantly is probably driven by your knowledge and experience in reality so may be that's not a good one."

[2] 1. Involving people & 2. Democratic, versus 3. Autocratic.

"I guess the definition of democratic is that you involve people in the process of making the decision and I guess autocratic is the opposite where you have made your decision by your self."

[3] 1. Financial & 2. Based on practicality, versus 3. Involving people.

"Now frequently, well not frequently but occasionally I find that the financial imperatives, the practical imperatives of running a business are – certain things have to be done - there is not a hell of a lot of point in involving people in those decisions they just have to be done."

[4] 1. Analytical & 2. Based on knowledge, versus 3. Instant.

"Analytical, the definition of that is you have accumulated all of this knowledge and you have analysed it so that you can come to a knowledge based decision, and as opposed to instant where you are reacting or making an instant decision,

where you haven't gone through the analytical process. And that can be perfectly valid if the decision does not require a lot of knowledge to make."

[5] 1. Financial & 2. Analytical, versus 3. Involving people.

"I guess financial and analytical go together quite nicely, because its financial, analysis its numbers, its dollars-- dollars in dollars out, and some times those things are -- they are a sort of simple analytical process involving bringing the people dimension into the decision-making – sometimes we make decisions that are not – that are a balance between the people side of it and the financial side if your running for short term financial gain this sort of process will win out but at the expense of long term issues long term organisational goals involving people."

[6] 1. Based on practicality & 2. Autocratic, versus 3. Democratic.

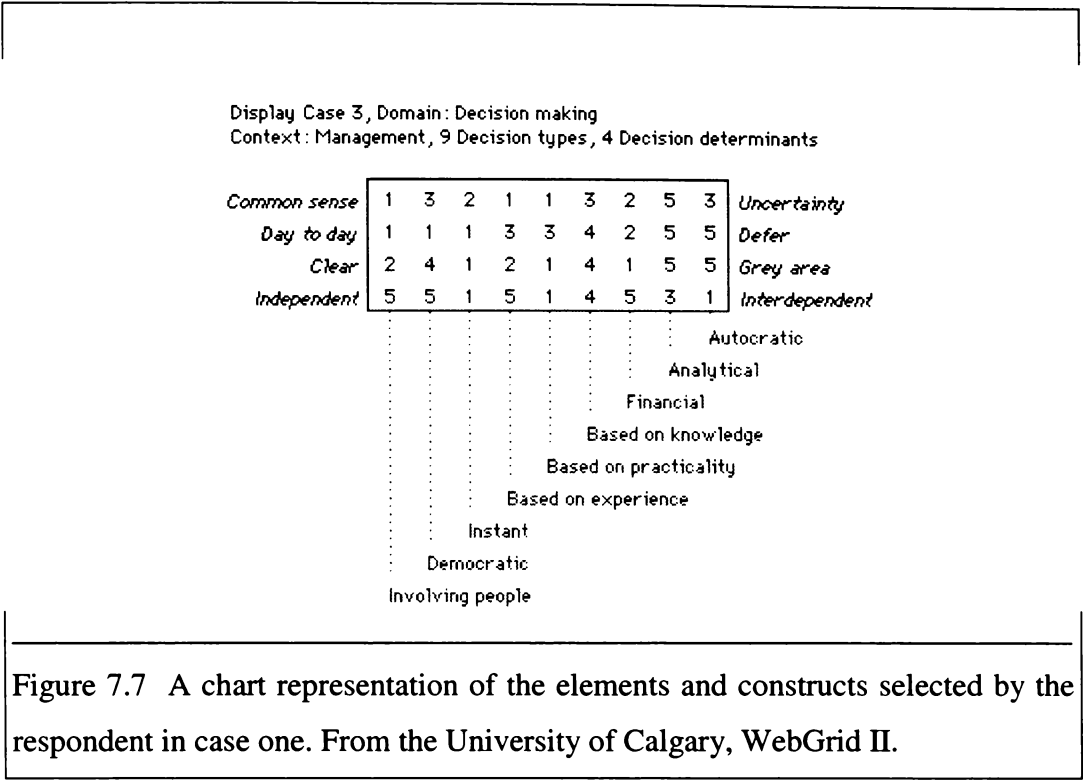
"Again it's sort of I guess there are just practical imperatives that exist in the business that we are in and its almost preordained that you are going to have to make that decision and the involvement of other people – you could put involving people there as well as democratic – a democratic process is not going to change the process that imperative."

The chart that follows (figure 7.7) shows the nine words that the respondent selected, these form the elements of the Rep Grid process, and are displayed as the vertical columns. The value response that the respondent attached to each word forms a construct in the Rep Grid, and they are the horizontal columns.

Analysis of Rep Grid data requires a re-sorting of the data to find correlations that place similar constructs, and similar elements, together. The FOCUS computer program performed this evaluation process, known as cluster analysis. The result of the FOCUS evaluation is shown in figure 7.8.

The FOCUS analysis indicates a correlation between the elements 'based on experience' and 'involves people' at 90% and between these two elements and the element 'financial' at approximately 85%. The elements 'based on practicality'

and ‘instant’ correlate at approximately 85%, and the elements ‘based on knowledge’ and ‘democratic’ correlate at approximately 75%, as do ‘autocratic’ and analytical’. There is an apparent correlation overall at 70%.



The cluster analysis indicates that the respondent has four close associations in his decision-making processes. There is no clear indication that any particular decision-making elements dominate. The indication is that there are discrete decision-making processes that the respondent resorts to possibly based on his perception of the criteria being assessed. The respondent’s declared inclination to be autocratic and analytical are clearly correlated but far less so than the 90% correlation between the elements ‘involving people’ and ‘based on experience’, which are factors that the respondent has declared that he is trying to develop.

The construct evaluation shows an 80% correlation between ‘day-today/defer’, ‘clear/grey area’, and ‘common sense/uncertainty’. These three constructs correlate with the construct ‘interdependent/independent’ at 70%. However, there is a wide spread of values associated with each construct, which possibly indicates that the respondent has no strong bias.

The constructs used are those created by the respondent in Case One, and were used in an attempt to provide comparable data throughout the cases. Consequently only the weighting of the elements within the constructs is important here.

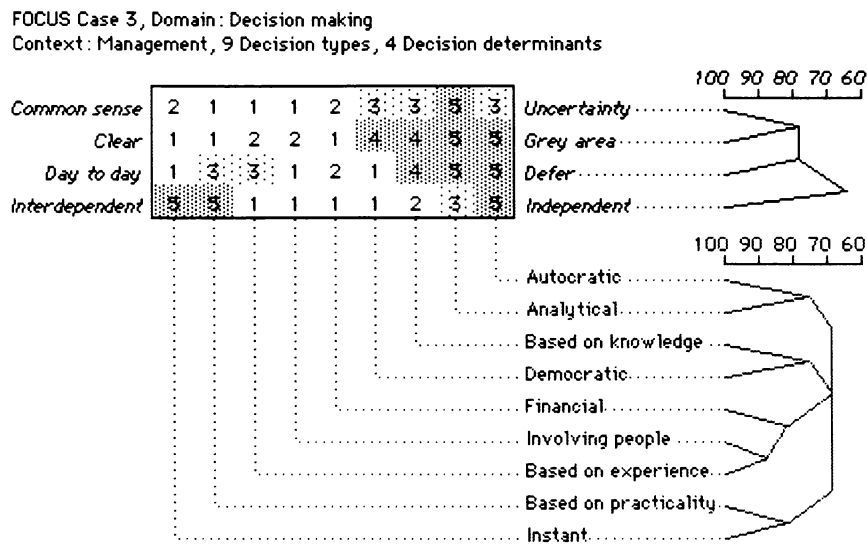


Figure 7.8 FOCUS evaluation of the respondents Repertory Grid responses. From University of Calgary, WebGrid II.

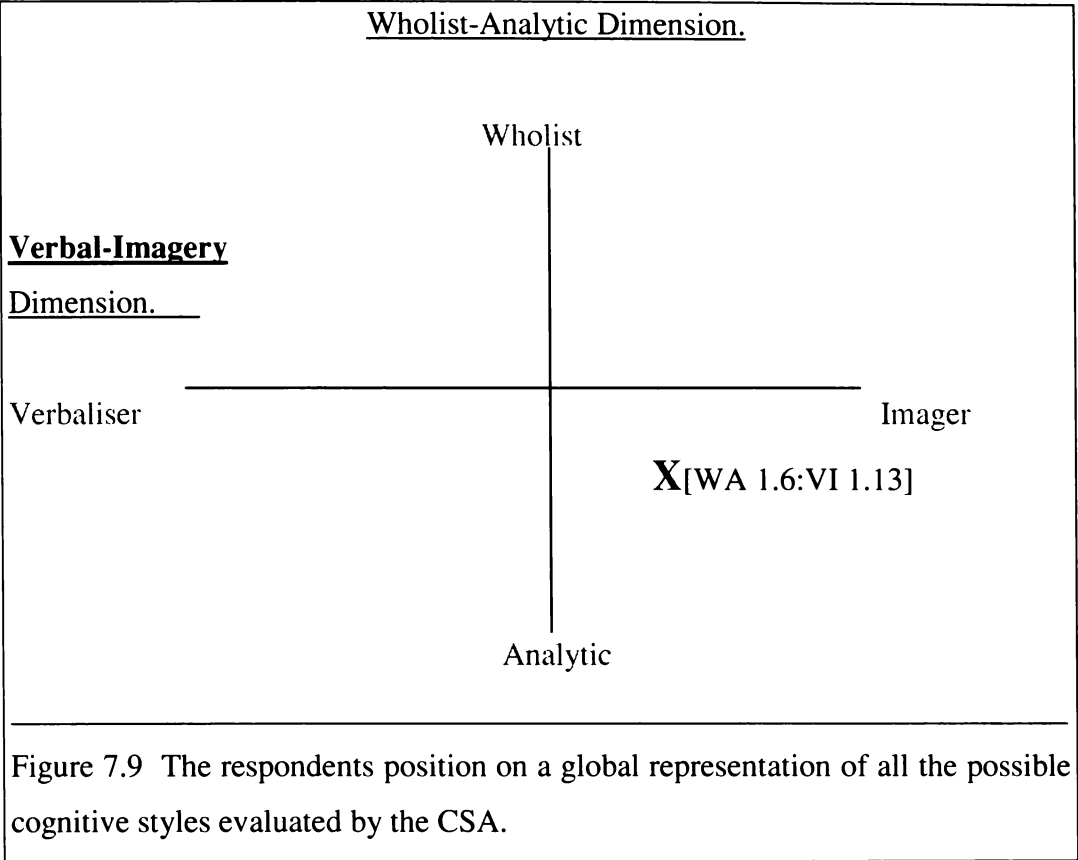
Cognitive Styles Analysis (CSA)

The respondent evaluated as an Analytic- Imager: WA 1.6 :VI 1.13, meaning that the respondent is right of centre on both the Wholist-Analytic dimension, and the Verbal-Imager dimension, as shown by the X in figure 7.9.

The CSA manual describes the decision-making style of an Analytic-Imager as follows:

This person should be good at analysing situations and obtaining a clear view of the important issues when considering problems or plans and the best way of doing things.

He tends to be reflective in planning situations and he is inclined to look for new ideas.



Because he can often appreciate a range of options and has a desire to examine them and weigh up the pros and cons he is sometimes hesitant in making decisions. This can lead to him being indecisive.

The positive side of his way of thinking is that he is consistent, but the negative will be an inclination to rigidity and stubbornness. He is idealistic and inclined to follow a set of principles. He can be socially unrealistic in terms of what others are likely to accept although he is often logically correct.

Myers-Briggs Type Indicator (MBTI)

This person provided an Introverted, Intuition, Thinking, Perception (INTP) response to the MBTI. The following is an interpretation of the respondents INTP response obtained from the MBTI Manual.

Introverted thinkers use their thinking to analyse the world, not to run it. They organise ideas and facts, not situations or people unless they must. Relying on thinking makes them logical, impersonal, objectively critical, not likely to be convinced by anything but reasoning. Being introverts, they focus their thinking on the principles underlying things rather than on the things themselves. Since it is hard to switch their thinking from ideas to details of daily living, they lead their outer lives mainly with their preferred perspective process, in this case intuition. They are quiet, reserved, detachedly curious and quite adaptable – till one of their ruling principles is violated, at which point they stop adapting.

INTP's see possibilities. They value facts mainly in relation to theory. They are good at pure science, research, maths and the more complicate engineering problems. They are apt to have insight, ingenuity, quick understanding, intellectual curiosity, and fertility of ideas about problems. They are more interested in reaching solutions than in putting them into practice, which others can do as well.

Case report number four

The respondent in this case is a work associate of the respondent in Case Three. During the data collection for Case Three, I became aware that the respondent was potentially a suitable person to study, and when asked she readily agreed to participate.

A vignette

The respondent in this case study is female, age 30, born in New Zealand. Ethnic origin English /Yugoslav

This person is the Regional Accountant for a Research Institute, a position that she has held for two years. She is a chartered accountant with more than ten years training and experience in accounting. Her experience, prior to this position, includes working for four different accounting and taxation companies. During that time she studied part time to become a chartered accountant.

In her current position as Regional Accountant, she reports to the Regional Manager who featured in the third case study, and to the General Manager for Finance at the corporate office. She is responsible for all accounting procedures for the region, for management of five staff, and management of the site including health and safety, maintenance, and security.

Her expertise is in accounting. She has two years experience in this management position, and two years prior experience in a similar position.

Her interests outside work indicate that she may not be a ‘typical’ accountant. As she states, *“I’m very involved in action methods as a training thing.”* She explained this as a personal development program derived from psychodrama, that she is undertaking outside work as a personal development project. She is also involved in counselling work, which she sees as useful in her management of people.

Throughout the interviews and psychological evaluations she continually questioned my questions - *“why is it an important part of my job, what do you mean by that?”* – and the questions in the psychological evaluations, and often found alternative meanings.

Interview transcripts

First transcript: The respondent

The respondent states that decision-making is an important part of her job, *“yes it is, I seem to be constantly called on to make decisions. Because it’s my responsibility to ensure that we meet budgets, I need to make those sort of decisions. I try to get other people to make decisions where possible, and I make decisions as an overview, sort of an overview person, I guess like having an overview of the whole thing.”*

She makes decisions about purchasing capital items, and other major expenditure. *“Like a scientist coming to ask can I have this or I need such and such or something has broken down. Or insurance, which is another part of my job. Can we pay this money to this person? There are tax questions as well. Decisions on things around the site, like can we make the water pressure in E block better because I can’t wash my boats.”* Clearly she is involved in more than accounting, but she states that most decisions are financial.

If she makes a decision that somebody is not happy with she states *“they would escalate it to the Regional Manager. In some cases I would already of discussed it with him, or found out what the policy is, or what process we need to go through, like there are a lot of things around here that have happened over a long period of time so some times I need some history.”* She does consider her decisions in terms of how they will *“affect their general working day whether they are happy or if it affects peoples day to day functioning really and its not going to – it doesn’t make a huge impact on their science.”*

She considers that it is highly unlikely that, if she made an error when making a financial decision that it would not be detected before it had an adverse effect. *“If it was a big decision I probably would have checked it out with corporate office anyway. One of my staff might pick it up or it could get picked up at corporate office, I suppose it might never get picked up. Well you know some times things slip through, I mean if it was big it would get picked up.”*

When asked how she prefers to make decisions she replied, *“the way that I usually make decisions is to find out the full story. If it’s a small thing I would usually just make a decision on the spot, I would get some background on why somebody needed it, or why this had to happen right now, or whether it could wait till next financial year. I might find out some history find out what other people think if it was something about boats, or motor vehicles, or something I would contact somebody on the boat committee, or I would discuss it with the workshop technician. So I seek experts as well as just you know – so I go round it a bit find out some history from the Regional Manager may be, or policy, or that sort of thing.”* This suggests that she seeks out information, assimilates it, and then makes what she sees to be an appropriate decision. *“Yea. That’s how I prefer to make decisions go right round then come back and right that’s what we are going to do.”*

From her comments it is clear that she prefers not to make hurried decisions. *“I prefer not to make decisions in a hurry where I’m under pressure to say yes or no, without having done any research or discussed it with anyone.”*

The respondent states that she is “*not sure if her training in accounting has helped with decision-making I don’t know if my training in accounting has helped with my decision-making I guess a lot of the decisions I’m called on to make are financial ones. But no I don’t know the answer to that one.*” However, when asked to consider whether her accounting background had formalised her decision-making, or if her decision-making is just her natural way, she replied “*I think there is a bit of both I do it in my own way. I also, I mean I have learnt something’s from the Regional Manager since I have been here, and having to make decisions a lot is one way of leaning to make decisions I guess, and being an accountant is quite structured so I am quite structure in my approach.*”

The respondent considered that her managerial role has necessitated a change in her decision-making style. “*I guess sometimes I have to make decisions quickly, so to some extent it has modified my decision-making style, and also knowing some history or policy or what ever means that decision-making is easier to some extent yea.*”

The respondent considers her decision-making to be easier in this management role because “*there is a standard to say that because that falls within this criteria that actually should go against your project, rather than against overheads. Yes, so I guess making decisions more quickly and having some background does help, yea.*”

Second transcript: The assistant accountant

This person answers directly to the Regional Accountant, and has held the position for 18 months. Before joining this organisation she was self-employed for 17 years, running a business jointly with her husband. Although she has no formal qualifications, the years spent in business have apparently developed sufficient expertise in accounting for this position, and she is now studying for a business diploma at a polytechnic.

As the assistant accountant she spends “*quite a lot*” of time working with the Regional Accountant. Her work is dependent on the Regional Accountant, as she states, “*basically a lot of my job depends on (the respondent) like she’ll have something for me to do and she’ll bring me out something and say can you sort this out, can you look into this, can you ring these people and find out what is going on that sort of thing.*”

When asked if she is involved in decision-making situations with the respondent she replied that there are many situations where they work together to reach decisions, “*just about everything involves decisions*”, although as expected, the respondent makes the final decision.

This person considers the respondent’s decision-making style to be, “*very informed. She likes to get all the facts first. She asks the other people concerned a lot, like we are asked for our input before the decision is made rather than make the decision and every one has got to live with it.*”

The respondent, in this person’s experience, is particularly good at involving staff in decisions that effect them “*she is excellent, we are always consulted about it and you get the feeling that what you have to say is influencing the decision not just saying it and having it totally ignored. So that it is actually going in, and being taken on board of course the decision may not always be the one you want but you can at least see why it has happened.*” She could not think of any decision-making situation that the respondent has difficulty with, although she did state that dealing with staff issues could be difficult. This is more a difficult situation rather than having difficulty with the situation. “*If it is negative consequences, yes I get the feeling that she doesn’t like doing that but nobody does – we always do things together so it’s a really major thing.*”

This person’s view of the respondent’s decision-making is that she has no clear preference for simple clear-cut things or the more complex things. “*I think she takes it pretty much in her stride she certainly doesn’t get flustered or seem to get worked up about things – on the out side anyway.*”

She states that the respondent's approach to management decisions involves getting *"the facts first, she likes to know all the ins and outs of what is happening and all the background to it before she makes a decision sort of quite thorough."*

In her experience the respondent can on occasion take some time to deliberate over a decision, particularly if people are involved.

This person sees that the respondent's background in accounting may influenced her when she makes some decisions. *"I think possibly it does tend towards the accounting I think perhaps a times the money has the final say, but that's just my assumption from things she has said, I think if it came down to two choices and one was cheaper I think that the bottom line would be the way to go."* Q. What happens when she is dealing with people? *"I think in that instance it would probably be different. It would be more the person concerned. The situation rather than the money. Although in any background the money is never far away, it really does keep creeping in."* Q. Are you saying that as the regional accountant, even though she considers people she would still have to remember that 'as Regional Accountant I am here to control the finances'? *"Yes I think that is exactly it."*

The respondent's decision-making style is, according to this person, characterised by her willingness to consult. *"She asks for your opinion and listens to you opinion and if she disagrees with your opinion it is explained why she disagrees with you, and then it also gives you the chance to disagree with her again as well And as I say, what you say to her you get the impression is being thought on and being listened to churned around and is being used to make the decision which is excellent."* In this person's opinion the respondent is consultative and more democratic than autocratic. *"Yes definitely."*

Third transcript: The Regional Manager

The Regional manager, featured in the previous case study, is the Regional Accountant's immediate supervisor. As, discussed earlier, the Regional Manager is a research scientist who has moved into a management position. He states that the respondent answers directly to him, and provides him with all the financial information that he needs to manage the business. She also provides information on *"scheduling of peoples time and so on within our system, I also ask her to manage the budgets for the overheads we have got for the site, and to produce running reports on that and other site related issues like health and safety."*

The respondent works with this person to establish the budget for the region, and to justify that budget to the chief executive. *"Through the year we have got mutual decision-making on spending that budget, but also on the overall financial position and on how that is reported. And the analysis of that, because some of the financial reporting relies upon estimates of how complete a job is. And there is a bit of scientific knowledge required in that, so that's another sort of regular decision-making process that we go through. Other things are in terms of arrangement or staff issues relating to the accounting staff and reception staff and how it should be arranged. It's more, I guess it's sort of a joint decision but I rely more on some sort of recommendation."*

When asked to describe the respondent's decision-making style he replied that *"unbelievable as it may seem I believe that she's more analytical than me. Well I guess there is two sorts of style, I believe she is more analytical than me on a lot of things, in that she would like to have a lot more written policies and set guide lines to follow so that we could follow through those, and follow through that procedure, and this is the decision out of it. Where as I'm a little bit sort of, well lets just think about it and just come up with the answer for the particular circumstance. So in that sense I think she prefers to be more sort of analytical on a lot of things, but then on other things she gets an idea and is enthusiastic about it wants to go with it."*

He considers that the respondent is *“black and white about a lot of things, I like people who are black and white in some ways because when I get a recommendation it’s black or white its not some shade of grey and so to me that’s easy I can say you have gone wrong here or yea that seems like a good idea so I get something definite and I get a definite opinion and whether I take it on board or not is another matter but at least its definite.”*

In this person’s view the respondent is *“particularly good at decisions on people. I’m not sure that she thinks she is or not. I’m not sure about that, but I think she is, and decisions on organisation of people and what their work should be. Those sorts of things. So getting everybody organised, giving somebody set procedures to follow. I believe as you go into this sort of thing, the accounting clerks sort of area, you don’t want somebody like me who doesn’t set things out, you want somebody like (the respondent), who does have set guide lines to follow. So I think she’s particularly good at reading people and making decisions on that sort of thing. I trust her judgement on making decision on about hiring the right people.”*

In response to a comment about the respondent being interested in people, he replied that when he recruited for the position of Regional Accountant, the respondents position, his main objective was to find a person who could create *“a user friendly administration”* and he considers that the respondent achieves that. *“She’s very good with picking the team and very good at getting that message through to her team, that that’s what they should be doing. And she is very good with the scientists as people. And, yes I think you are right accountants are not usually like that.”*

He considers that, like most people the respondent is uncomfortable with decisions that require reprimanding people. *“I think she is uncomfortable, we all are I suppose, with hard decisions on people when they are not performing or up to scratch, and not going to get a salary increase. Those kind of things. On the financial accounting side I think she finds it difficult to make sort of decisions – what these accountants seem to do is to categorise expenditure into all these boxes and I think she may find it quite difficult to do that. Because we have the corporate accountants which are checking on that, and she is finding it difficult to*

make a decision because if its wrong they might think she is incompetent. I think that kind of thing is running through her head. I don't see it as a problem, the accountants have been complaining about those kind of things for ages. I think where the issue comes is personal interactions between her and the people that are doing the final allocating to the boxes. She probably feels that they are not recognising her professionalism, some clerk up there deciding the box she is putting it in is the wrong box, fair enough comment I would say."

In this person's view the respondent's management decision-making style is "analytical, definite. This is, on the whole, one thing I am not sure about yet. I should be I guess, but I'm not. Where on the spectrum between democratic and autocratic she falls. Whether she is autocratic and then gets her team on board because of her personality, or whether she is democratic because of the definite views, definite sort of black and white thing she has. I just don't know how the interaction occurs between her and the team she is managing, so I'm not sure where she falls on the autocratic democratic line. I suspect that she may well be tending towards autocratic."

The respondent's is still learning in the management area but, in this person's opinion her accounting background and her personal approach to decision-making appear to shape her decision-making. "I think I guess she's still comparatively young and she has her chartered accountants sot of side of it. She knows what she is doing. But on some of the other things she doesn't know, when she starts out on something, how its going to turn out. But I think that when it gets down to the nitty-gritty of making a decision, whether that be what recommendation she gives to me on health and safety or what ever, she makes it in the same way."

His opinion is that she her decision-making approach is dominated by her personality rather than her accounting background. "I think that really shows on the basis of the fact that her personality overwhelms the stereo type of an accountant. People say 'you've got really good one we have never had accountants like her' so that overwhelms the training she's had, because she has got other interests she may have talked to you about, in terms of what's it called."

Psychodrama and things like that so she is a people person and understands people so it is surprising that she chose to become an accountant, but!"

When asked what, in his view characterised the respondent's decision-making, he relied "*well we have sort of said it already really. Definite, and black and white about things. I would say clear as well, which comes out black and white I guess. One thing I can't stand, well I live with it, that is asking people to go away and come back with a recommendation on something, and for them to come back with sort of four recommendations, none of which they favour, or are willing to put a priority on. She doesn't do that, she tells me what she thinks is best.*"

Observations

The first impression of the respondent is of a rather loud friendly person who is busy getting things done. She speaks quickly and briefly. Where, in earlier cases, other respondents had offered additional information to amplify their response to questions, this respondent was brief to the point that she required prompting, to acquire sufficient information. However, she was very keen to be involved in the study, and particularly interested in the outcome of her psychological evaluations.

The respondent appears to be a strong-minded person who has to be sure that she understands questions before she will commit herself to an answer. On several occasions she asked, "*What are you getting at*" in response to questions that had not caused problems in earlier cases. This same problem was evident in the CSA test, which is discussed later. The CSA provides answers from which the respondent is expected to pick the best to answer the question asked. This respondent, on several occasions stated that she did not agree with any of the answers offered.

The respondent’s decision-making appears to be guided by her continuous search for answers to questions, which seems to be a personal trait rather than something that her accountancy training has developed. The impression is that accountancy has given her the knowledge and method for enquiry, but that she has always been a questioning person. However, despite the analytical approach to decision-making there is an impression that she may have formed an answer at the outset and that the analysis is used to confirm that decision.

Psychological evaluations

Repertory Grid Technique

The following are the nine words selected, as most representative of the decisions faced, by the respondent.

1. Based on experience 2. Intuitive 3. Instant 4. Involving people 5. Based on practicality 6. Financial 7. Considered 8. Easy 9. Based on knowledge.

“Financial has to be there doesn’t it and I like to make easy decisions.”

The following are the respondent’s verbal responses to the structured interview process that forms the data collection part of the Rep. Grid.

[1] 1. Involving people 2. based on practicality, versus 3. Instant.

“The two that I see as related are involving people and based on practicality I use them in conjunction with on another. What was your question? Why do I see them as similar? To have enough knowledge to make a decision based on practicality you need to involve the other people that are relevant or involved in the practice

of what ever and making an instant decision doesn't always work in that way, so that's the third one."

[2] 1. Intuitive 2. Based on experience, versus 3. Financial.

"Intuitive and based on experience. I see those as quite similar often my intuitive response would come out of experiences in the past I reckon and that may or may not go with the financial side of things so it might be conflicting with a financial decision even though my experience is financial". Q. In what way do you think it might conflict. "If there was inadequate budget or, like, financial constraints on the decision that I wanted to make based on experience or intuition."

[3] 1. Instant 2. Easy, versus 3. Considered.

"Those two go together quite nicely instant and easy. I quite like those two and they would be opposed by a sort of considered decision."

[4] 1. Based on knowledge 2. Financial, versus 3. Practicality.

"Based on knowledge and. financial because my knowledge is financial those two sort of fit together and I guess that conflicts with the practicality of something and it may conflict with involving other people."

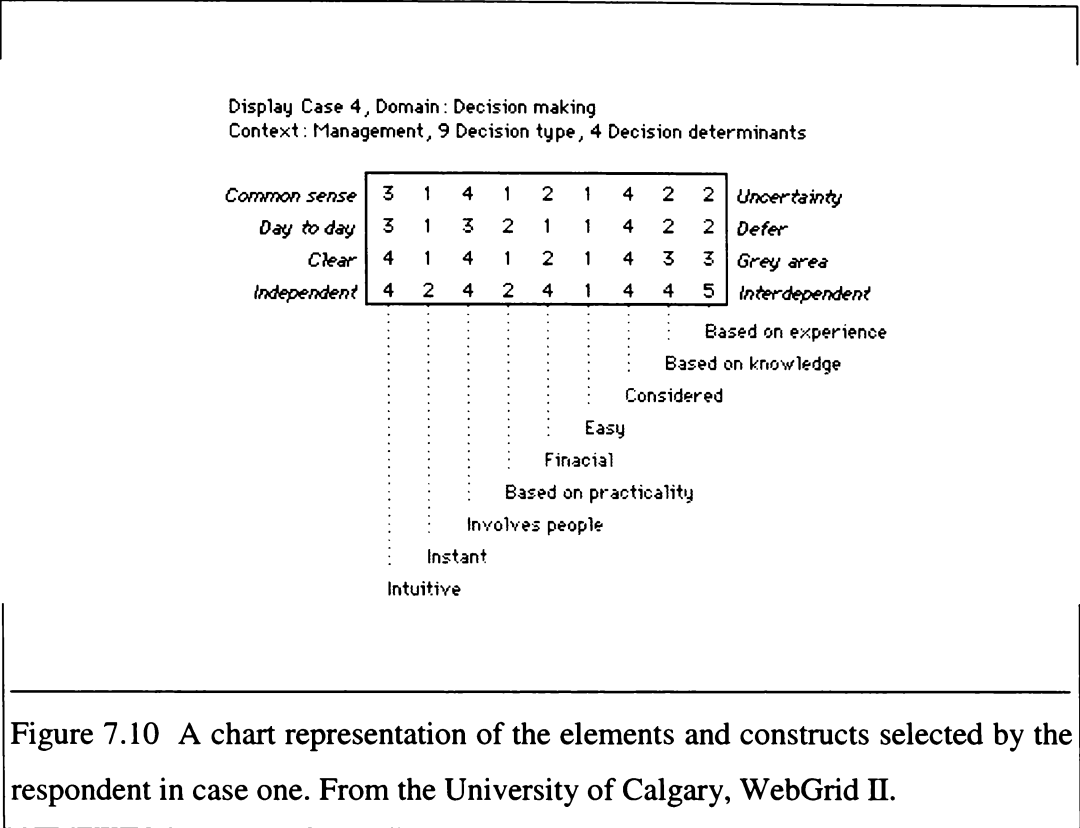
[5] 1. Based on knowledge 2. Financial, versus 3. Involving people.

"This is the same as the one before". [See above for an explanation]

[6] 1. Involving people 2. considered, versus 3. Intuition.

"Involving people and making a considered decision as opposed to Intuition." Q. Why do you consider those to be related? "Because involving people takes a bit of time and so does consideration so by the very fact of involving people you end up being considered in your approach I think because you have to look at more angles than one." Q. Why do you think that conflicts with intuitive? "Because intuitive is often the one thing "we'll do that" bang rather than taking a slow leisured approach."

The chart that follows (figure 7.10) shows the nine words that the respondent selected, these form the elements of the Rep Grid process, and are displayed as the vertical columns. The value response that the respondent attached to each word forms a construct in the Rep Grid, and they are the horizontal columns.



Analysis of Rep Grid data requires a re-sorting of the data to find correlations that place similar constructs, and similar elements, together. The FOCUS computer program performed this evaluation process, known as cluster analysis. The result of the FOCUS evaluation is shown in figure 7.2.

There are three distinct groups or ‘families’ of elements evident in this cluster analysis. The one group, correlated at approximately 95%, is formed by the elements ‘considered’, involves people’, and ‘intuitive’. Another group, also correlated at approximately 95%, is formed by the elements ‘based on practicality’, instant’, and ‘easy’. A third group, correlated at slightly less than 90%, if formed by the elements ‘based on experience’, based on knowledge’, and ‘financial’. The first two groups have a correlation between groups at

approximately 75%, and the three groups have an overall correlation at approximately 70%.

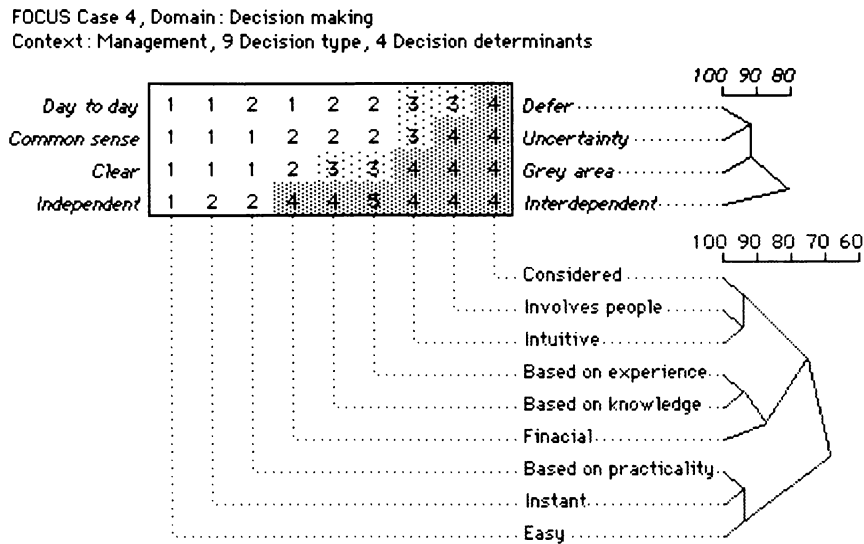


Figure 7.11 FOCUS evaluation of the respondents Repertory Grid response. From University of Calgary, WebGrid II.

The evaluation indicates that the respondent tends to separate her decision-making into two distinct modes. There are decisions that are based on her expertise, they use her knowledge and intuition, and tend to be perceived as easy by the respondent. He other decisions are based on practicality and experience which presumable has taught the respondent that an alternative decision-making approach is sometimes required. This second decision-making approach is closely associated with decisions that involve people and financial considerations. The respondent appears not to favour decisions that are either instant or analytical.

The Focus analysis of the constructs indicates slightly more than a 90% correlation between the constructs 'day-today/defer', 'common sense/uncertainty', and 'clear/grey area'. In turn the three constructs correlate with 'independent/interdependent' at approximately 80%. No particular bias is evident in the values attached to elements within the constructs.

The constructs used are those created by the respondent in Case One, and were used in an attempt to provide comparable data throughout the cases. Consequently only the weighting of the elements within the constructs is important here.

Cognitive Styles Analysis (CSA)

The respondent evaluated as an Analytic- Intermediate: WA 0.97 :VI 1.03, meaning that the respondent is left of centre on the Wholist-Analytic dimension, and slightly right of centre on the Verbal-Imager dimension. An Intermediate is said to be bimodal, as shown by the X in figure 7.12.

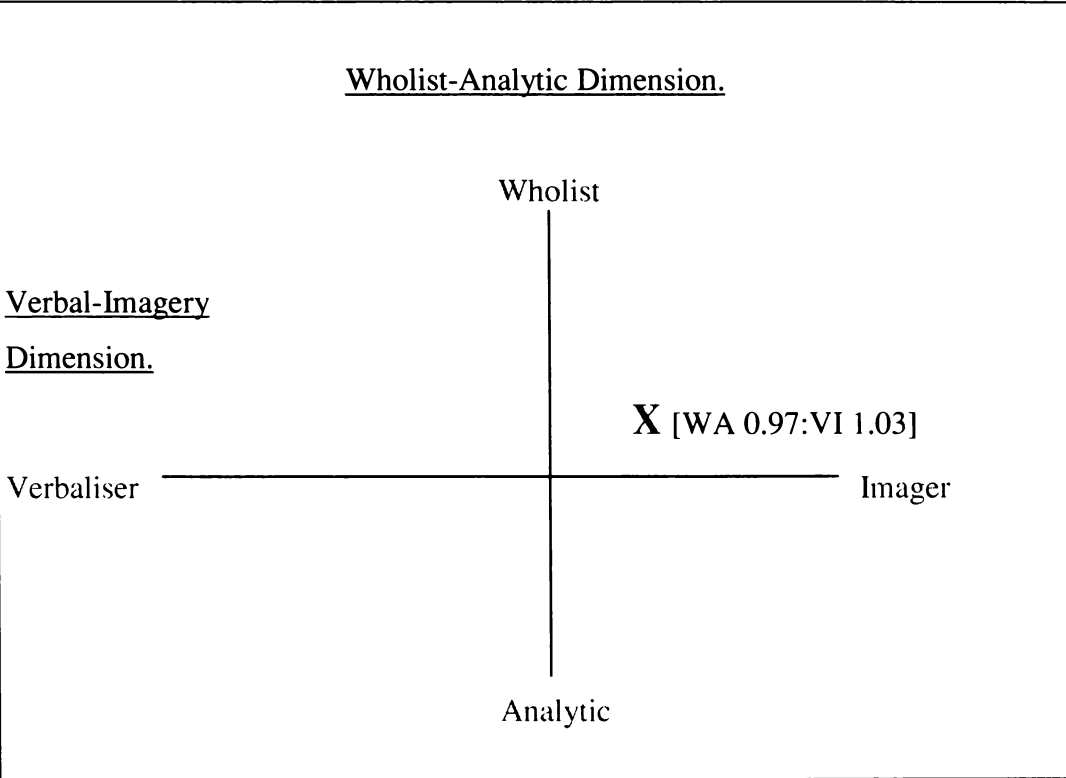


Figure 7.12 The respondents position on a global representation of all the possible cognitive styles evaluated by the CSA.

[Note: The respondent had difficulty with the verbal part of the CSA. As has been noted in the interviews that precede this report, the respondent tends to be ‘very

black and white’ when faced with alternatives, and in this test she found some difficulty in accepting the alternatives offered. Therefore, the number of correct responses on the verbal section is considerably lower than her response on the images section. This may mean that the final analysis of her cognitive style is not an accurate representation of her.]

The CSA manual describes the decision-making style of a Wholist-Bimodal as follows:

Able to see the whole situation and to have an overall perspective. Good at summing up situations. Realistic and ready to adjust to the circumstances.

Able to appreciate another person’s point of view and rarely show extremes of opinion. Flexible and will often be happy to fit into the plans of others. Willing to be directed and lead by others.

Open to persuasion and likely to change her mind fairly rapidly. Decisive occasionally to the point of being impulsive.

In planning situations where new ideas or methods have to be found she is likely to have knowledge that will be useful in generating plans.

Is insufficiently critical of ideas and plans.

Myers-Briggs Type Indicator (MBTI)

This person provided an Extroverted, Intuition, Thinking, Perception (ENTP) response to the MBTI. The following is an interpretation of the respondents ENTP response obtained from the MBTI Manual.

The extroverted intuitives are the enthusiastic innovators. They are always seeing new possibilities – new ways of doing things, or quite new and fascinating things that might be done – and they go all out in pursuit of these. They have a lot of imagination and initiative for originating projects, and a lot of impulsive energy for carrying them out. They are wholly confident of the worth of their inspirations, tireless with the problems involved, and ingenious with the difficulties. They get so interested in the current project that they think of little else.

With Feeling as an auxiliary. They tend to be more enthusiastic, more concerned with people and skilful in handling them. Much drawn to counselling where each new person represents a fresh problem to be solved and fresh possibilities to be communicated. ENTP's may be inspired at almost anything that interests them.

CHAPTER 8



Analysis and discussion

8.1 An overview of the case reports

The previous chapter presented a ‘thick description’ (Lincoln and Guba, 1985) of four case studies. There are two major links between the cases, first the managerial contextual setting, and second the consideration of a domain expert as the unit of analysis. In each case the respondent is a domain expert who has, by choice, become a manager of business closely aligned to his/her expertise. However, each respondent is an expert in a domain that differs from that of the other respondents and he/she works in an environment unlike that in the other cases. However, as no claim to generality of findings will be made the dissimilarity is not an issue.

A summary of the case reports is presented in figure 8.1; it shows that the case study respondents display strong personal characteristics that appear to determine their overall approach to their occupation, particularly how they make decisions. Each respondent has developed his/her own preferred approach to decision-making situations with clearly observable patterns and procedures.

The respondents also demonstrate preferences for types of decision that they attend to, or try to avoid. All of the respondents appear to be continuing in their personal development as decision makers, and in each case they have been able to identify strengths and weaknesses. They are all able to recognize the

	Case One	Case Two	Case Three	Case Four
Domain of expertise	Teaching	Teaching	Soil Science	Accounting
Interview	Considers most of his decision-making to be 'common sense'.	Focused, consultative, time manager. Decision-making based on expertise.	Inclined to be autocratic decision-maker, but aware of alternatives.	Considered analytical decision-maker.
Associates comments	Focused, perceptive, organised	Focused, thoughtful, problem solver.	Autocratic, considered, and deliberate.	Informed, consultative and deliberated.
Observation	Decision-making appears to be automatic	Strong motivation. Decision-making intuitive.	Intuitive decision-maker.	Strong analytical tendency.
Rep Grid	Quick, easy, common sense decision-making	Decision-making focused on experience, and knowledge.	Awareness of alternate decision-making processes	Separation of decision-making processes.
CSA	Wholist/Image r. Balanced perspective. Realistic and flexible.	Wholist/Analytic. Good situation analysts. Can appreciate a range of options.	Wholist/Analytic. Good analyst. Clear view of important issues.	Sees whole situation. Resolute decision-maker.
MBTI	ESFP. Adaptable realist. Always	ISTJ. Dependable realist. Practical,	INTP. Intuitive analyst with some	ENTP. Tireless problem

	finds the easiest solution.	reflective and responsible.	ability to adapt.	solver.
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Figure 8.1 A summary of the case reports.

limitations of their expertise and have developed personal strategies for coping with situations that are outside their area of expertise.

8.2 Supporting information from triangulation

The data collected via interview and observation has in each case been supported by the additional material collected from the people who know and have worked with the particular respondent; see Figure 8.1.

Additionally, the psychological evaluations provide interesting descriptive information (see Figure 8.1), which in three of the four cases appears to provide support for the two perspectives provided by interview and observation of the respondent, and by the interviews of people who know the respondents. In the fourth case the psychological evaluation does not align well with the other data, and this creates some concern.

However, overall the strong support between the data sources used in triangulation, suggests that the information obtained is trustworthy in terms of credibility (Cassell and Symon, 1994; Easterby-Smith *et al.*, 1991; Lincoln and Guba, 1985; Miles and Huberman, 1984).

8.3 Addressing the research questions

The research question that is the focus of this study is - What shapes the managerial decision-making processes of experts? The research question arose as a consequence of my interest in the influence of subjective variables (Einhorn, 1973), subjective characteristics (Shanteau, 1987), and cognitive style, on the decision-making processes of experts. I developed a case study research procedure (see Chapter 6: Research Procedures) to guide my research, and I subsequently carried out four case studies (see Chapter 7: Case Study Reports), which provided data to enable me to develop an answer to my research question. In the remainder of this chapter the case study reports are analysed.

The scope of my research question is potentially extensive, however my particular interest, and the focus of this thesis, is in the subjective variables that possibly shape an experts decision-making processes. Therefore I posed five specific but subordinate questions to aid in the analysis of the case data. The questions also have the potential to produce new and interesting knowledge about the function of experts' subjective variables in decision-making. The questions are:

Question 1. How does an expert make decisions in a managerial role?

Question 2. How do an expert's decision-making processes influence his/her managerial role?

Question 3. How does the managerial role influence the expert's decision-making processes?

Question 4. How does the expert's preferred decision-making style fit with his/her behavioural characteristics?

Question 5. How does the expert's management role fit with his/her behavioural characteristics?

8.4 How does an expert make decisions in a managerial role?

Answer: In a managerial role, the experts studied appear to make decisions in accordance with a personal hierarchy of influences, which is determined by, in order of strength strongest first, subjective characteristics, experience/knowledge, managerial goals and responsibilities, consideration for staff, and expedience.

The answer, presented above, is derived from the following evaluation of the material presented, as a thick description, in Chapter 7.

Case 1.

Summary of pertinent data

In the first case report, the respondent considers that in his business decision-making is largely intuitive, and that his expertise, in teaching and in outdoor pursuits, is not pertinent to his managerial role. Comments about the respondent indicate that he is amongst other things, focused, perceptive, independent, conscious of his responsibilities, and well organised. My observations were of a strong, determined person who makes apparently intuitive decisions within his domain of expertise, and deliberated analytical decisions in areas where he lacks expertise. His apparently intuitive decisions are on closer inspection an automatic response based on the knowledge gained through years of experience within his domain of expertise. It is also apparent that he has a strong preference for decision-making that involves people in a teaching situation.

There are two distinctly different managerial roles faced by the respondent. In the first he is an instructor, or teacher, who has responsibility for managing the safety and instruction of his clients. In the second he is jointly responsible for the management of a business that employs up to five staff to provide outdoor pursuits instruction. In the first role the respondent relies on his expertise when making decisions. In the second role there are factors that are outside his domain of expertise to be considered, such as financial matters and people management.

His expertise is important in this role, because the main business focus centres on his expertise, but he must consider additional information that is specifically business management and outside of his domain of expertise. The respondent admits to being uncomfortable in his managerial role because he is in his view lacking in some of the required skills, although he states that running a small business like his “*is seat of the pants intuition*”.

The evaluation of the respondent, using the Repertory Grid Technique, confirms his apparent inclination towards quick and easy decisions that call on his expertise, and his obvious separation of the more deliberated and analytical decisions called for by financial matters.

The CSA response describes the respondent’s decision-making style as able to see the whole picture with a balanced perspective, realistic, flexible and ready to adjust to circumstances.

The MBTI response, ESFP, indicates that the respondent is an adaptable realist, who is aware of what is going on, and finds the easiest path to a solution. It adds that this person prefers to make decisions using feeling rather than thinking, which is no help in situations requiring analytical processes.

In summary, the triangulation of data from interviews, observation, and psychological evaluation seems to be in agreement.

Data analysis

The data suggests that this person is likely to make most managerial decisions quickly, thereby giving an impression that his decisions are intuitive. In fact his decision-making processes are characteristic of an expert who has become sufficiently familiar with his domain of expertise. He is apparently able to automatically, and perhaps subconsciously, analyse a situation to form an appropriate and almost instant response (Ericsson, 1997; Hammond, *et al.*, 1987; Lipshitz, 1993; Simon, 1987).

In situations that are, in the respondent’s, assessment outside his domain of expertise, he becomes analytical, looking for information that will enable him to

make an appropriate response. However, contrary to some predictions (Carroll and Johnson, 1990) this expert seems to be clearly aware of his limitations outside his domain of expertise. When making these decisions the respondent is inclined to change from his preferred decision-making process, which relies heavily on his prior knowledge and experience, to one that is more consultative and dependent on the knowledge of others.

In his managerial role this expert makes decisions that appear to be firmly guided by his subjective psychological characteristics. He has definite decision-making preferences, which align with his psychological makeup, and with his expertise. However, when he is occasionally faced with decisions that do not align well with his psychological makeup, or his expertise, he consciously chooses to modify his decision-making processes to what he perceives to be a better suited procedure.

Case 2.

Summary of pertinent data

In the second case report the respondent is seen to be highly focused on her clients needs, and she indicates that her decisions are largely based on her expertise and experience. She also emphasises that practicality is an important consideration for her, *“because that’s the way I am”*. The respondent makes most decisions quickly, based on the knowledge and experience, which forms her expertise, although she admits that on occasion she prefers a consultative approach. This is supported by comments from work associates.

Interestingly one work associate indicated that the respondent has two different decision-making styles. One when the decisions involve people, and the other when material things are being considered. There appears to be a reliance on intuitive decision-making when decisions are clearly within her domain of expertise, although she does appear to weigh her decisions. As one person commented, *“you can see her thinking before she gives you an answer”*. However, this respondent appears to have an unwavering faith in her ability to cope with any decision-making situation that may arise in her managerial role. This may demonstrate that for this respondent the managerial role is merely an extension of

the role she plays as an expert in her field, and that it does not require her to move outside her domain of expertise.

The respondent's Repertory Grid response identifies two distinct, separate, and highly correlated groupings amongst her decision-making associations. The first distinct grouping, 100% correlated, is the association between decisions based on her experience and those based on her knowledge, which to the respondent appear to be synonymous. The second grouping, 95% correlated, includes the first group along with decisions based on practicality and those that involve people. The respondent mentioned many times how she relies on her knowledge and experience to guide her through her decision-making processes. She also indicated a strong concern for issues that concern people and the need to develop practical solution. Therefore this response fits well with the earlier data. However, the respondent's stated belief that she analyses and considers information before making decisions is not so strongly correlated at 80%.

The CSA response indicates a person whose decision-making is analytical, likes to weigh the 'pros and cons', is inclined to follow a set of principles, and is usually realistic. Also she will prefer verbal interaction to resolve issues. Overall the CSA response aligns well with data obtained through interview and observation, and with the indications gained from the Repertory Grid.

The MBTI response, ISTJ, also supports the earlier data, and is a very strong representation of the person in this case report. In particular the MBTI suggests that this person will have complete, realistic and practical approach to decision-making situations, with a characteristic pause for reflection before accepting what needs to be done.

In summary, the triangulation provided by the interviews, observations, and psychological evaluations, seems to agree on the makeup of this person.

Data analysis

The respondent's managerial decision-making does not appear to differ from her usual decision-making processes, which are representative of the expert decision-

making processes described in the literature. However, despite comments and observations, which suggest that this respondent makes quick and apparently intuitive decisions, she indicates that her decision-making is considered and analytical. This supports the idea that intuition is really analytical processing that has become internalised to the extent that it is automatic and can be used without conscious effort (Simon, 1987). This may appear to an observer, to be an intuitive response. All the indications are that she has internalised appropriate analytical processes to such a high degree that her decisions appear to be intuitive.

Within her decision-making processes there is an identified difference between the respondent's approach to decisions involving people and her approach to other decisions. The respondent's psychological evaluation suggests that she is inclined to be very concerned for the welfare of others. The MBTI indicates a person of this type, ISTJ, is inclined towards fields where systematic attention to detail is combined with care for people. Therefore the respondent's particular concern for decisions that involve people may be a personality trait.

Case 3.

Summary of pertinent data

In the third case report the respondent's managerial role relies on his expertise for background knowledge, but much of his decision-making relates to issues that fall outside his domain of expertise. Within his domain of expertise the respondent was, according to his comments and those of a work associate, inclined to make quick decisions based on his personal knowledge and understanding of a situation. Now, in his managerial role, his decision-making process has been modified to accommodate the need to consult with others and also to accept the guidance of people who are expert in areas where he is not. Also, the respondent uses his strong analytical training where possible, and he likes to think carefully before making a decision.

The respondent is more at ease with decisions concerning material things rather than people. His natural inclination is to be friendly and considerate towards people, and he feels a need to be democratic in his decision-making. In his

managerial role this can lead to personal conflict, which he recognises, and deals with by recognising that his responsibility is to make decisions that are best for the organisation, and ultimately the people employed by the organisation.

The Repertory Grid response clearly identifies the respondent's autocratic analytical inclination, although it is not particularly highly correlated at 75%. However, the respondent's autocratic/analytical inclination is clearly separated from other groupings that are displayed. It is perhaps surprising that the grouping of decisions based on practicality and instant decisions, correlated at 85%, does not form a close grouping with autocratic/analytical; the correlation between these two groups is only 70%. Surprising because the respondent indicated that his autocratic nature enabled him to achieve quick, practical results. Nonetheless, it is interesting that the respondent identifies, during the Rep Grid data collection, that instant, apparently intuitive decisions are *"driven by your knowledge and experience in reality"*.

The CSA response clearly identified this man's analytical inclination. This suggests that he is able to make competent assessments of situations to obtain a clear view of important issues for his decision-making. The CSA also identifies the concern that he may not be as competent when making decisions that involve people.

The respondent's MBTI response, INTP, clearly identifies this person. He is, according to the MBTI, a person who prefers to organise facts and ideas, not situations or people. Additionally, he is identified a quiet, reserved, and adaptable person. The MBTI states that this type of person makes a good pure scientist.

In summary, the triangulation of interviews, observations, and psychological evaluation appears to agree on the makeup of this person.

Data analysis

The respondent's managerial decision-making processes, outside his domain of expertise, seem to rely heavily on his strongly developed analytical ability. The psychological evaluations indicate that his analytical approach is a strong trait,

part of his personal makeup, which may have lead him to become an expert scientist.

The respondent has three defined decision-making responses in his managerial role. First, where his expertise is perceived to be relevant, he chooses to process decisions based on his knowledge and experience. In this situation he tends to be autocratic, and sure of his ground, making decisions that appear to be intuitive but, as he acknowledges, they are based on past knowledge and experience. Second, his decision-making processes outside of his domain of expertise are clearly different. He recognises the need to consult with people who possess greater knowledge than he does on defined topics, such as accounting and information technology, but he still feels that he can often follow his natural inclination to be analytical and autocratic.

The respondent's third decision-making process requires consultation with staff members who are immediately affected by his decisions. This consultative decision-making process is apparently a conscious attempt, by the respondent, to counter his natural inclination to be autocratic. He is aware that, in his managerial role, a democratic approach to decision-making can provide a more harmonious and therefore easier to manage and more productive organisation. This third decision-making process differs from the respondent's natural inclination, and has required a conscious effort on his behalf. Although colleagues have identified him as a considerate, sensitive person, he has admitted that he is not naturally inclined to be democratic, and this is what the psychological evaluations suggest. In conflict situations his natural inclination towards an autocratic analysis of things and facts may limit the respondent's ability to adapt to the decision-making processes required in his new role.

Case 4.

Summary of pertinent data

The fourth respondent managerial role can be seen as an extension of her expertise, in most situations. The respondent is inclined to follow the well-established techniques and rules that have been part of her training and experience

while she became a domain expert. She likes to have all the information for consideration, and to be aware of any precedents, before making a decision based on her expertise. In her managerial role she has had to accept that often decisions need to be processed quickly without access to all the desirable information.

There is a clear indication that although the respondent is an enquiring, analytical person, who likes to make well-informed decisions, she can adopt a different approach when faced with decisions that involve people. There have been several comments that suggest that with financial matters she is quite analytic, autocratic, and mechanistic, but with situations involving people she is different. The respondent is seen as a democratic, considerate person who listens to other people before making decisions.

The respondent's Repertory Grid response identifies associations, at a 95% correlation, between considered, 'involves people' and 'intuitive' decision-making situations. There is also a 95% correlation between 'based on practicality', 'instant', and 'easy' decision-making situations, and also between 'based on experience', and 'based on knowledge' decision-making situations

As noted in Chapter: 7, the respondent's evaluation on the CSA is not optimal because she was unhappy with the solutions offered in some questions and therefore did not provide the best possible response. However, that situation emphasised her inclination to question everything before making a decision. The CSA response obtained indicated that the respondent is capable of making a good assessment of situations presented to her; she is realistic and able to adjust to circumstances. It also indicates that she is able to relate to other peoples views and willing to work with others.

The MBTI response, ENTP, indicates a very versatile, confident, and enthusiastic person, who will tirelessly pursue solutions to problems. This type of person is, according to the MBTI concerned with people because they gain satisfaction from resolving people's problems.

In summary, the triangulation formed by the interviews, observations, and psychological evaluations appears to clearly identify, and represent this person.

Data analysis

The respondent's expertise clearly shows in her management role, where she demonstrates the expert's inclination to rely on knowledge and experience when processing decisions. However, this respondent shows a strong inclination to search for all the information possible before processing the decision. This suggests that in most situations her decisions are deliberated and analytical rather than the quick and analytical decisions that frequently cause observers to conclude that experts' decision-making is intuitive (Simon, 1987).

The respondent appears to be highly analytical, however, 'analytical' was not one of the decision-making elements that she selected, and consequently it is not possible to assess how she would associate the other elements with the element 'analytical'. Her omission of the word analytical highlights the role of language, and the need to allow for differences in meaning and interpretation. Nonetheless, the fragmentation that is evident in the respondent's Repertory Grid response indicates that she separates the key components of her expertise, experience, knowledge, and financial matters, into a discrete decision-making group. Furthermore, the respondent forms two additional, strongly correlated groupings, 'considered, involves people', 'intuitive' form one and 'based on practicality', 'instant', 'easy' form the other. It is interesting that the three strongly correlated groupings are relatively weakly correlated with one another at approximately 70%. Perhaps the respondent's apparent analytical approach to decision-making arises from a need to identify which of her three decision-making associates is appropriate for the problem she is facing.

The case study, in which the respondent features, provides convincing evidence that the respondent is a domain expert, but there is also an indication that she has strong subjective characteristics that are not necessary within her domain of expertise, but are now being used in her managerial role.

Cross case analysis.

Summary of pertinent data

The move into a managerial role has had little influence on the first respondent. He continues to use his dominant decision-making processes in all the situations for which his expertise has prepared him. He is aware that he lacks expertise in financial and administrative matters and, although he takes a managers interest in theses topics, he readily accepts advice and guidance from those who he trusts to make appropriate decisions.

In the second case, although the respondent has become a manager there appears to be no noticeable requirement for her to work outside her recognised domain of expertise. Consequently her decision-making processes have not had to change, and are typical of what is expected from an expert.

In the third case the move into managerial roles has caused the respondent to adapt to his new decision-making environments, and to develop coping strategies. This has necessitated the acceptance of a decision-making approach that is contrary to the respondent's natural inclination and in opposition to what his psychological evaluation indicates as his preference. The data suggests that he is able to achieve this contradiction through conscious effort, but it seems that when under pressure he could revert to his natural disposition.

In the fourth case, the respondent apparently has no need to change her decision-making processes, only to develop them further. She clearly prefers an analytical approach to decision-making, but has not had reason to develop the quickness that is so often characteristic of experts. As an accountant, before becoming a manager, the goal of her decision-making was to ensure that all available information was considered, this is apparently standard practice in her domain of expertise. Now, however, she accepts that in a managerial role timeliness is often critical, and decisions frequently must be made with adequate rather than complete information. Consequently, as a manager, her decision-making

processes are continuing to develop towards those apparently intuitive decision-making processes that typically characterise an expert.

There was in each case an indication that decisions that directly involve people may be processed differently from other decisions. This phenomenon is not identified in the literature. Each respondent indicated that their decision-making process would necessarily include a consideration of the interests and welfare of those people for whom they are responsible, if those people could be affected by the decision under consideration. This occurs more easily when it is the respondent's natural inclination but, as the third case study demonstrates, it can also occur against the respondent's natural inclination, when the respondent makes a conscious choice to act in a different manner.

In cases 1, 2, and 4, the respondent's have shown a natural inclination towards dealing with people. This was evident in the interviews, observations, and the psychological evaluations of these respondents. In case 3, although the respondent demonstrates a concern for other people, which is supported by comments from work associates, he admits that this, as his psychological evaluation indicates, is not a natural inclination when processing decisions. In this case the respondent has come to accept that, in his managerial role, making appropriate decisions where people are involved is possibly the most important aspect of his role from the organisations perspective. Two comments from the respondent indicate his concern; *"I do constantly do a check on myself, just in my head, ...am I slipping back to my natural autocratic way"* and *"We sell peoples time, that's how we make our money. We have got to have them motivated and with good morale. They need to know where they are going and feel secure. So if we haven't got that, then none of the financial things work."*

Summary.

The psychological disposition of the experts studied appears to strongly determine their overall approach to decision-making. This psychological disposition was evident in the interviews and observations, and is supported by the psychological observations. Furthermore, there appear to be two additional psychological associations that have a bearing on the respondents' actions. First, there is an

indication that the experts have achieved expertise in a particular domain due to their possession of an appropriate psychological makeup. Second, there is an indication that psychological disposition can determine how the experts use the knowledge that they have acquired.

Beyond consideration of the psychological constraints the managerial decision-making processes of the expert are predictably similar to those of expert's in general, when working within their domain of expertise. That is, they rely heavily on the prior knowledge and expertise that qualify them as experts (Ericsson, 1997; Shanteau, 1992). However, the respondents did apparently demonstrate a greater concern for their staff responsibilities than has been reported in the literature. This concern for staff responsibilities can apparently cause experts to select alternate decision-making processes from that which would otherwise be chosen if staff were not affected.

Outside their expertise, they seem to recognise their limitations but, although they often do not acknowledge it themselves, they appear to call on some important aspects of their expertise to resolve issues. They search for information, which they can process with their highly developed analytical skills, and constantly search for cues that may indicate an appropriate solution. Therefore, it appears that experts who operate outside of their defined domain of expertise can and do use domain specific expertise that is appropriate in many situations outside of their specific domain of expertise. This may not ensure that they are 'good' decision makers outside their domain of expertise, nor that outcomes from their decisions will be appropriate, or not be equivalent to those of experts within that domain. However, it does suggest that decisions made by experts acting outside of their domain of expertise will be as well processed as those of experts within that domain. Also, it may be possible for them to acquire expert decision-making status in less time than it would take for a novices to acquire expert ability (Ericsson and Charness, 1994) and to quickly achieve recognition by associates as experts (Shanteau, 1988).

8.5 How does the expert's preferred decision-making style fit with his/her subjective characteristics?

Answer: The respondents' subjective characteristics appear to determine and define their decision-making styles. Evaluations obtained through cognitive style and personality traits assessment provide, in three of four cases, an accurate prediction of the respondents' decision-making style. This is not unexpected, because the CSA and the MBTI do claim to indicate decision-making style. However, the data obtained in my research suggests that there is a particularly strong alignment between the predicted and the observed decision-making processes, which in turn suggests that these psychological evaluations may have particular value in the study of experts.

The answer, presented above, is derived from the following evaluation of the material presented, as a thick description, in Chapter 7.

Case 1.

The respondent, in case one, has demonstrated that his dominant decision-making processes appear to be automatic, to the extent that they may be considered to be intuitive in the sense that Ericsson (1997), Simon (1987) and others have described. He is apparently able to automatically, and perhaps subconsciously analyse a situation to form an appropriate and almost instant response. He relies on his own judgement, which is based on more than twenty years experience as an instructor. Before beginning instruction he talks with his clients about their prior experiences and their aspirations, then asks them to perform specific tasks so that he can assess the clients current competence. The respondent is then able to adjust his instruction to the client's ability. Therefore the respondent is seen to have a considered approach to his decision-making.

However, once he has established the level at which he needs to instruct, his decision-making processes appear to be automatic. He gives an impression of

always being in control, and of being able to respond immediately in any situation. This probably comes from his focused, perceptive, and conscientious approach to his task that was identified in interviews, and his *“ability to see clients in a time/skill continuum, and to deal with them at their level with a view to advancing their individual skills.”*

Overall, his ability to call on *“experience/enthusiasm”* after more than twenty years in this occupation is, as many people have said, so characteristic of him. This continued dedication to his occupation has given the respondent a reputation as an outstanding instructor who shows great personal interest in his clients, it must also support his own claim that his managerial strength is *“enthusiasm and single mindedness”*. Consequently, the respondent’s dominant subjective characteristics that associate with his decision-making processes can be summed up as considered, perceptive, focused, independent, and flexible.

The psychological evaluations appear to give an accurate account of this person, as he is represented in the interviews and observations. The Cognitive Style Analysis (CSA) indicates that, as a Wholist-Imager, the respondent should have a good grasp of the overall situations that he faces, and be able to form a balanced perspective, particularly where success requires that several aspects need to be developed together. It indicates that he is realistic, flexible and ready to adjust to circumstances.

The CSA response is complemented by the MBTI’s which indicates that, as an ESFP, he is inclined to be highly aware of the facts around him, which this type notice and remember more than any other. It also indicates that he will have an effortless economy in the way that he deals with situations, never taking the hard way if an easier one will work. The MBTI indicates that he has an inclination to make decisions based on his feelings, which I interpret to mean intuitively. This appears to account for his apparent automatic response to situations. Additionally, his reliance on his feelings provides him with the appropriate personal skills to sustain his interest in people.

The psychological evaluations indicate that the respondent's dominant decision-making processes appear to be well aligned with his cognitive style and his personality. There is also an apparent agreement between the psychological evaluations and the data obtained through interviews and observation. As success in a particular field is known to come more easily to those that are psychologically suited (Ridding, 1991), this clear alignment between the respondent's subjective preferences, both expressed and as indicated by psychological evaluation may account for the respondent's outstanding success in his chosen occupation.

Case 2.

The respondent in case two is seen to prefer a considered, organised, and analytical decision-making processes. The data indicates that the respondent's occupation, as the manager of a hospital school, requires her to make decisions that are well within her domain of expertise, and that she is particularly comfortable with this situation.

Although the respondent has to make many managerial decisions that do not involve people, it is clear from the interviews and observations that she attends to these decisions in a different way to those that involve people. This separation is clearly identified by a work associate who stated "*I see two quite distinct styles, or perhaps she still has that (same) feeling for what she wants from people but she just approaches it in a different way.*"

In overview the respondent's dominant decision-making processes appear to be considered, and analytical, with a typical experts reliance on knowledge and experience. The respondent is clearly a 'people person', but she is apparently also motivated by her own desire to achieve her objectives.

The psychological evaluations are consistent with and appear to support the interviews and the observations. The respondent's comments during the Repertory Grid evaluation emphasise the respondent's awareness of her reliance on her experience, and her differentiation between decisions on things and decisions that involve people. The CSA indicates that the respondent is a competent analyst,

with a clear view of important issues. Also, because she is able to see a range of possibilities she is inclined to weigh the pros and cons. The MBTI response, ISTJ, identifies the respondent's tendency to reflect on her decisions, and her readiness to accept responsibility. The respondent's inclination to rely her knowledge and experience to form strong ideas is also identified.

In summary, the respondent's subjective characteristics that associate with her decision-making processes, as identified through interviews and observation, are a great dependence on the knowledge and experience that form her expertise, a clear inclination to analyse and deliberate over issues, and a strong determination to follow her own ideas. By indicating that the respondent's natural disposition is to behave as she was observed to in her managerial role, the psychological evaluations support these findings.

Case 3.

The dominant decision-making processes of the respondent, in this case, are readily identified as an independent reliance on his expertise, which is based on a highly developed analytical ability. The respondent has demonstrated that he prefers to make autocratic decisions based on his own assessment of a situation. However, in his managerial role his natural inclinations are not, in his view always appropriate.

Although he has been described, by a work associate, as "*a sensitive kind of decision-making person*", his natural inclination is to be autocratic in his decision-making. However, in his managerial role the respondent considers that decision-making based on a more democratic process is more likely to produce the desired results. The respondent's position as a manager requires an interaction with and a consideration of people. He needs to consult with people to obtain relevant information for his decision-making. To achieve the organisations objectives he must ensure that employees are provided with an environment that encourages and motivates them to undertake appropriate research.

The managerial role that the respondent has assumed is clearly different from his role as a research scientist, but in his managerial role the respondent's expertise is important. It clearly shapes his approach to his position, and his coping strategies. His natural inclination to analyse situations and issues, and to form his own decisions has enabled him to conclude that, in his managerial role, there is a need for different decision-making processes to be used dependent on the objectives being pursued. In particular he has identified a perceived personal deficiency in decision-making situations that require an interaction with people. He consciously attempts to modify his natural inclination toward autocratic decision-making to achieve what he considers to be a more appropriate, democratic decision-making processes.

The psychological evaluations appear to support the interview and observation data' which indicates that the respondent has a strong preference for analytical decision processes, and has an inclination to rely on his own assessment of situations and issues. The respondent's Repertory Grid commentary identifies his clear separation of analytical and autocratic from other elements. The CSA finds that he should be a competent analyst with a clear view of important issues, but he is also idealistic and can be inclined to follow a set of principles. The MBTI response, INTP, clearly identifies the respondent's inclination to analyse the world. It also indicates that he likes to organise ideas and facts, not situations and people. His reliance on thinking indicates a logical, impersonal and objectively critical person. However, he is also seen to be an adaptable person when it suits him.

However, there are some indications in the psychological evaluations that were not apparent in the interviews and observations, and are perhaps contradictory. The CSA indicates that this type of person may weigh up the pros and cons to the extent of becoming hesitant in making decisions, leading to him being indecisive. In his managerial role, the respondent was observed to consider information before reaching a decision, and a work associate commented that the respondent is "*particularly good at going away and thinking about issues ...to find out what the issues and options are.*" However, his ability to reach a decision was not in doubt, and he appears to be a very decisive person.

Although the overall representation of the respondent by the MBTI corresponds well with the information obtained about the respondent through interview and observation, there are also some indications about this person's type that are not supported by the interviews and observations. The MBTI indicates that this type of person will not use his analytical inclination to organise situations or people unless he must. Yet he is, by choice, in a managerial role that does require him to do both. Also there is an indication that this type will be more interested in reaching solutions than in implementing them. Once again, the implementation of solutions is an important part of this manager's role.

In summary, this respondent's dominant decision-making processes are generally aligned with his subjective characteristics, as they are indicated by the psychological evaluations. Nevertheless, there are some characteristics that the respondent displays in his managerial role that are apparently in contradiction to both his cognitive style and his personality, such as his awareness of 'people issues'. However, the explanation for this apparent anomaly may be provided by his natural inclination to be both analytical and adaptable. Being analytical enables this type to see situations that must be resolved, and being adaptable allows him to modify his approach so that he can resolve situations.

Case 4.

The dominant decision-making processes of the respondent in this case are seen to be analytical, and very considered. As an accountant she has developed a reliance on structured processes and continues to look for these in her managerial role. Also the respondent likes to have all the information that she considers to be necessary, which she then deliberates on in detail before making a decision. However, in her managerial role she has had to modify her approach to decision-making. As a manager she often has to make decisions without complete information and more quickly than previously.

The respondent's expertise as an accountant is clearly suited to her managerial role as Regional Accountant. However, the managerial role requires additional

functions to be undertaken that were not essentially part of her expertise. The respondent has several members of staff answering directly to her, and she also has a regular involvement with other staff members within the organisation. The interviews and observations indicate that the respondent is well suited to this additional function. She appears to relate well to people and demonstrates a keen interest in their welfare. Work associates have indicated that she is, perhaps unusual as an accountant, due to her general disposition towards dealings with people.

Overall, the respondent appears to be constantly questioning things and events that occur around her, this appears to be a personal trait, not something that has developed as part of her expertise in accounting. In fact it appears that her training in accountancy has given some structure to her natural inclination to question. This also shows in her interests, in counselling and psychodrama, that she is pursuing outside her managerial role.

The psychological evaluations are not totally in agreement with each other, but do give some indication of the respondent's dominant decision-making processes, although they are not as clearly aligned with the interviews and observations as may have been expected. The Repertory Grid commentary identifies the respondent's inclination to separate decisions involving people from those that are simply based on her expertise. Also her willingness to apply more time to decisions involving people is noted.

It was noted earlier that the respondent's CSA response might not be an accurate representation of the person due to her difficulty answering an unusually high proportion of the questions. Therefore, as the CSA's indications do not correspond with the data obtained through interviews and observation it is probable that this confirms the inadequacy of the result.

The MBTI however produced an interesting result. The respondent's dominant interest in decision-making processes that involve people was clearly identified. The MBTI states that people of this type are more concerned with people (than other people) and skilful in handling them, and are drawn to counselling where each new person represents a fresh problem to be solved and fresh possibilities to communicate. However, the strong tendency to question and analyse all situations

and issues that were clearly evident in the interviews and observations were not predicted by the MBTI. The respondent’s natural exuberance is indicated by the MBTI, but the further indication that the respondent is an innovator, always seeing new possibilities that she pursues relentlessly was not obvious in the data.

In summary the triangulation used in this case does not work well. The respondent’s dominant subjective characteristics, as noted during interviews and observations do not align well with the psychological evaluations, although some personal characteristics are clearly identified. Perhaps the most interesting outcome in this case is the recognition of the respondent’s strong interest in people, which could not have been predicted from her expert status, and is particularly surprising in view of her chosen career as an accountant; a career, which does not appear to be attractive to people with the respondent’s traits (Bathurst, 1996).

Cross case analysis.

The dominant decision-making processes of the respondent’s in the first three cases were representative of the subjective characteristics that were indicated by the psychological evaluations. In the fourth case the Repertory Grid analysis produced a good correspondence with the interview and observation data. However, although there is an apparent correspondence between the interview and observation data and some aspects of the MBTI, overall the alignment was poor, and an unreliable CSA response failed to add useful data to the case.

Of particular interest in all cases is the dominance of the respondent’s cognitive style and personality traits over the task characteristics of their managerial roles. This appears to be a clear demonstration of the influence of subjective variables on the decision-making process as predicted by both Einhorn (1974) and Shanteau (1987).

8.6 How do an expert's decision-making processes influence his/her managerial role?

Answer: In this study it is apparent that the experts' decision making processes determine their actions within their managerial roles. The managerial role determines the goals and objectives, but the expert determines how to achieve them. In answer to the previous question I concluded that the experts decision-making processes were representative of their subjective characteristics, therefore, my conclusion here is that an expert's decision-making processes influence his/her managerial role through a direct application of the experts subjective characteristics. The case data indicates that experts have a strong preference for particular activities, which enable them to use their subjective characteristics to their advantage, as a consequence experts are inclined to shape their managerial role accordingly.

The answer, presented above, is derived from the following evaluation of the material presented, as a thick description, in Chapter 7.

Case 1.

The respondent in case one has expertise in a domain that has little in common with what may be called a stereotypical managerial role. His expertise in outdoor pursuits does include management of complex situations, but not the administration of finance and people in a way that is usually associated with business management (Mintzberg, 1989). As a consequence it could easily be concluded, as the respondent does, that his expertise is of no value in his managerial role.

However, many skills are developed during the lengthy process of becoming an expert (Ericsson and Charness, 1994), and expertise has been shown to be dependent on domain knowledge, psychological disposition, cognitive skills, decision strategies, and task characteristics (Shanteau, 1993). The respondent has been described as focused, perceptive, well organised, and conscious of his

responsibilities. All of these are likely to be an asset in any managerial role, and additionally the respondent also brings to his managerial role an experts decision-making skills.

Considering the five factors mention above, which form the basis of expertise, it seems clear that the respondent's domain knowledge is important in a business that specialises in instructing people in outdoor pursuits, as are his decision strategies and cognitive skills that have developed within his domain of expertise. An evaluation of his psychological disposition indicates that he should easily see the overall situation facing him in a managerial role and be able to develop a balanced perspective. He is also seen to be a realist who copes easily with decision-making situations. Several times the respondent has been identified as a person who relates well to other people, and his psychological evaluation reinforces this. However, the task characteristics of his expertise relate to only a proportion of his managerial role, and in particular exclude financial management. This is not a major problem for the respondent because his partner in the business is trained in financial accounting.

In summary, the respondent appears not to recognise the value of his expertise in his managerial role, yet his decision-making skill as an expert appears to be well suited to his role as manager, in this particular business situation. The financial decisions faced by this small business could possibly cause the respondent some anguish, but his partner attends to the financial decisions, so the difficulty is avoided. If decisions are required that clearly fall within the respondent's domain of expertise, then he will make them as a matter of course, once again demonstrating experts' internalisation of analytic decision-making skills. For decisions that the respondent considers to be outside of his domain of expertise he will defer and consult, and willingly accept advice and guidance. Overall, the respondent's decision-making processes appear to determine his role as a manager.

Case 2.

In this case the respondent's managerial role appears to be well within her domain of expertise. The respondent, a teacher, is a highly organised person who has, throughout her career, developed management skills as part of her way of doing things. She is recognised as a person who analyses and considers information and situations before acting, and her decisions are respected. Additionally, it is noted that she is ambitious, likes to be in control, and enjoys recognition as a leader, but consults readily before acting on what she believes to be the best solution.

The respondent's domain knowledge is clearly relevant in her managerial role, as are the task characteristics, and her cognitive skills. The psychological evaluation indicates that she is very capable of analysing situations to gain a clear understanding of critical issues, and prefers to weigh the information carefully before deciding. She is, according to her psychological evaluation disposed toward an occupation that includes a systematic attention to detail combined with care for people, which is an accurate description of her managerial role. Therefore I conclude that in this case the respondent's decision-making skills are totally appropriate for her managerial role. Furthermore, they apparently determine how she fulfils her managerial role.

Case 3.

In this case the respondent has an expertise, as a scientist, that is clearly relevant for the organisation that he manages; a research institute. The majority of the organisation's staff consists of scientists and laboratory technicians, so the respondent's expertise in scientific research is clearly an asset in his managerial role. However, in this case there is evidence of some conflict between the way in which the respondent is generally disposed to make decisions, and the requirements of his managerial role.

The respondent's natural disposition appears to be that of a self-reliant person who prefers to deal with facts and things, rather than people and situations. Nonetheless, the respondent has excellent domain knowledge, cognitive skills,

decision strategies, and task characteristics for the scientific decision-making processes that may be faced in his managerial position. However, his psychological evaluation, although it clearly indicates that he is suited to scientific research, suggests that he is inclined to be impersonal and unrealistic in his expectations of others, and more interested in finding solutions than in implementing them. This does not appear to indicate a psychological disposition that is suited to a managerial role.

The managerial role occupied by the respondent is perhaps unusual. As a research institute the organisation's output is an intangible called 'knowledge' produced by people. It cannot be measured in terms of production or product, only in how well the scientific research produced satisfies the organisations clients. Therefore, a major proportion of the respondent's managerial role is to achieve the organisation's goals through the management of people.

However, the respondent, as his psychological evaluation indicates, is quite adaptable. He quickly became aware that to succeed in this managerial position he would need to alter his decision-making processes. For example, he realised that often he can best achieve organisational goals by providing a guiding hand while allowing others to make the decisions that they must follow through. Additionally, although he may still follow his natural inclination to make autocratic decisions based on his own judgement, he constantly reminds himself that to achieve his overall objectives he needs to be democratic and consultative wherever possible.

In summary the respondent's managerial decision-making processes are strongly influenced by his natural inclination to be an autocratic, analytic decision maker, more comfortable with his own mental images than with verbal representations with other people. He does, however, demonstrate a strong desire to overcome his natural inclinations so that he can meet the requirements of his managerial role.

Case 4.

In this case the respondent's managerial role is largely covered by her expertise as an accountant. However, as a manager she has additional responsibilities that may

require her to make decisions outside of her domain of expertise. The domain knowledge, cognitive skills, decision strategies, and task characteristics that she has as an expert appear to be well suited to most of these additional responsibilities.

There are however two areas where she has had to adapt to her new position. First, the respondent has a strong inclination to be analytical almost to the extent of being pedantic, and has found that in management she often has to make decisions more quickly than she would prefer, and often on incomplete information. Second, it is unlikely that the respondent's expertise has prepared her for the management of people that is part of her managerial role, but the respondent seems to be very able to cope with this additional role.

There is indication from my observations and from the comments of her work associates that the respondent has very good interpersonal skills. Her psychological evaluation indicates she is a person who does not fit a stereotypical description of an accountant. Although it may be assumed that accountants are tireless problem solvers, the other indications, that she is good at summing up situations, realistic, and flexible, with a readiness to appreciate the views of others, seem to be more suited to a position with a higher interaction with people. The additional psychological indicator, that she is inclined to be an enthusiastic innovator, who is concerned with people, and drawn to counselling, is apparently an accurate representation of the respondent, and also suggests that her natural inclination is to work with people.

In summary the respondent's expertise is well suited to her managerial role, and her expert decision-making processes are apparently appropriate. Therefore, her managerial role should not be expected to influence her expertise, although her expertise can be expected to develop further due to the additional stimulus provided by the managerial role. The respondent's demonstrated interest in interacting with people seems to add an important additional dimension to her managerial role, that is not explained by her expertise. The major interest here is that the respondent's psychological disposition, a characteristic of expertise

(Shanteau, 1993), does not appear to be in complete alignment with the respondents domain of expertise.

Cross case analysis.

An expert's decision-making skill is apparently beneficial in a managerial role, and that role is influenced by the expert's general disposition. In the first case the expert does not recognise his expertise to be either influential or beneficial in his managerial role. However, his expertise is central to his role as chief instructor and manager of the organisation. His inability to recognise this perhaps demonstrates that as an expert he accepts his abilities as the norm, and therefore can only recognise his lack of ability in particular functions, such as financial management. Therefore, in the first case the managerial role is influenced by the respondent's general disposition towards the main function of the management role, and his perceived inadequacies are disproportional to the actual demands of the role.

In the second case the expert's management role is within her domain of expertise. Consequently, unlike the first case, she has all the expertise necessary to cope with her managerial role. The respondent naturally follows a systematic approach to her role; she has strong leadership inclinations, and is naturally disposed to be concerned about the welfare of people. Consequently, her managerial role is influenced to the extent of being dominated by her expertise and personal traits.

The third respondent, unlike the first two, is in a managerial role that does not require his expertise in an operational way, but does rely heavily on it for decision-making. His knowledge and experience guide him in most of his managerial role. Although his natural inclination is apparently not to be a manager of people, he has chosen to adapt to this role as a means to progress his career. Clearly the managerial role is influenced by his expertise in scientific research, and his natural inclination towards an analytical solution appears to guide him in areas where he is not an expert. Therefore this expert's general disposition

combined with his expertise has completely shaped the managerial role that he occupies.

The fourth respondent, somewhat like the second respondent, occupies a managerial role that is largely an extension of her role as an expert. Her expertise as an accountant is essential to her managerial role, and central to the function. However, this respondent has found that in her managerial role she can exercise facets of her natural disposition that have not featured in her role as an expert. There is evidence that the respondent is apparently inclined toward working with people, and derives satisfaction from resolving people's problems. This seems to be a personal disposition not associated with her expertise, but it is very influential in her managerial role.

In summary the managerial roles occupied by all four respondents are influenced and shaped by the subjective characteristics that determine the decision-making processes associated with their expertise. However, the natural disposition of each respondent appears to play an important part in how each expert responds to the demands of their managerial role. The second respondent's managerial role is completely aligned with her natural disposition and, perhaps as a consequence of this, her expertise completely dominates and shapes her managerial role. In the other three cases the respondent's expertise also dominates their managerial roles, but their natural dispositions are not so closely aligned with their roles.

In the first and third cases the respondents recognise the boundaries of their expertise and use their highly developed analytical processes to seek solutions. In the first case, the respondent's partner is able to process the financial decisions that are outside the respondent's domain of expertise, so that the respondent can concentrate on his area of expertise, which aligns with his natural disposition. In the third case the respondent's natural disposition, to be analytical, enables him to determine what should be done, and his ability to adapt allows him to develop coping strategies that build on his expertise. The respondent in the fourth case has demonstrated that her natural disposition to be analytical, which apparently suites her expertise as an accountant, combines well with another of her traits, an interest in peoples problems. These two natural dispositions appear to enable this

respondent to influence and shape her managerial role beyond what may possibly be expected from her expertise.

8.7 How does the managerial role influence the expert’s decision-making processes?

Answer: The managerial role provides the experts studied with a variety of problems that may not be directly related to their domain of expertise, and as a consequence the experts have a need to consider issues that they may not otherwise face. Therefore, although the influence of the managerial role does not appear to be sufficiently strong to modify the experts decision-making processes, there is some evidence that the experts in cases one, three, and four have applied some lateral thinking to their decision-making where decisions are different from those usually faced within their domain of expertise.

In each case the influence of the respondent’s managerial role on the expert’s decision-making processes appears to be minimal. This is, perhaps to be expected. After at least ten years developing the ability to process decisions as experts, it seems unlikely that the respondent’s subjective characteristics, on which the decision-making processes are based, will have altered as a consequence of a brief period in a management role. What appears to happen is that the experts demonstrate, contrary to some suggestions (Camerer and Johnson, 1991), that they are aware of their limitations, and can apply their expertise in decision processing to seek appropriate solutions outside their domain of expertise.

The answer, presented above, is derived from the following evaluation of the material presented, as a thick description, in Chapter 7.

Case 1.

Case one presents an expert who is clearly aware that there are situations outside his domain of expertise. Although he does consider that much of what he has to contend with in his management role is common sense “*seat of the pants intuition*”, his expert decision-making processes seem to make him aware that appropriate decisions require the skilled attention of someone who has the appropriate expertise. In this case there is little indication that the managerial role is influencing the respondent, other than to make him aware of this limitations.

Case 2.

In case two the respondent appears to have total mastery of her managerial role and there is apparently no indication that the role is influencing her decision-making processes.

Case 3.

Case three is perhaps the most influenced by the managerial role. In this case the respondent has chosen to adapt to the requirements of the managerial role. However, because the adaptation appears to be taking place largely outside the respondent’s domain of expertise, it is wrong to say that the managerial role is influencing the expert’s decision-making processes. The influence has apparently stimulated a natural inclination, within the respondent to adapt to situations when he perceives it to be to his benefit.

Case 4.

The respondent in case four is noticeably influenced by her managerial role. Before assuming a managerial role the respondent was apparently able to analyse and deliberate over information until she was satisfied that the appropriate decision could be made. In her managerial role the respondent has come under pressure to make timely decisions, which can often necessitate quicker and less considered decision processing. Therefore, in this instance the respondent is changing her expert decision-making processes, but the change is slight and will

apparently bring her expertise more in line with the accepted ability of experts to make fast analytical decisions (Hammond *et al*, 1992; Simon, 1987). There is no evidence to suggest that the change will impact on her subjective characteristics, and thereby alter her decision-making processes.

Cross case analysis.

The overall indication is that expertise can resist the influence of the demands of a managerial role, at least in the short term. This resistance may also be associated with the general disposition of the respondents. The respondents have clearly demonstrated that they are experts in domains to which they are suited and, as it appears that their move to managerial positions has been done by choice, it is perhaps unlikely that they would feel any pressure to change.

This outcome is largely to be expected if it is accepted that subjective characteristics determine the decision-making processes of an expert. Subjective characteristics are usually robust psychological features that are stable unless subject to extreme trauma.

8.8 How does the expert’s management role fit with his/her subjective characteristics?

Answer: In each instance the respondent’s managerial role is apparently well suited to his/her subjective characteristics.

The answer, presented above, is derived from the following evaluation of the material presented, as a thick description, in Chapter 7.

Case 1.

In the first case the respondent's role is that of manager, chief instructor and chief guide for a highly respected kayaking school based in New Zealand. The business has two functions. One function is to provide white water kayaking instruction for clients ranging from beginners through to experts, to provide safety and rescue training, and to train and assess outdoor pursuits instructors. The other function is to provide guided tours and expeditions to remote parts of New Zealand and other locations throughout the world.

The school provides accommodation for clients, rental equipment and has a retail outlet for various items of outdoor pursuits equipment including kayaks. It also arranges tour packages for groups who want to participate in outdoor pursuits.

This business is highly regarded throughout the industry because of the particularly high standards it maintains. These high standards create a managerial role that is mentally and physically very demanding. However, the respondent lives at the centre, and is involved in business activities through out the day, yet always appears to be at ease. His client's comments indicate a person who is friendly, sociable, accommodating, and accepting, while also organised and conscious of his responsibilities. It seems clear that the respondent's enthusiasm and focused attention, to what obviously is his occupation of choice, drives this business.

The respondent is identified, in the interviews and through observation, as a, single minded and focused person, who continues to demonstrate enthusiasm and personal interest in his occupation. The Cognitive Style Analysis aligns well with the data obtained through interviews and observation. It indicates that this person will see the whole situation that he faces and be able to form a balanced perspective, particularly where success depends on the development of several aspects of the situation being developed together. There is also an indication of the respondent's perceptive, and accepting attitude towards people.

The type of person indicated by the MBTI evaluation, ESFP, appears to be a accurate description of the respondent. This type is described as an adaptable realist, who notices and remembers more than any other type. He is consequently aware of what goes on, and of who needs what and who does not, and good-naturedly accepts and uses the facts around him. These characteristics were noted in the interviews and the observations. Additionally the MBTI indicates that this person will be have an interest in people and will be at ease in interactions with people, which he will handle with tact and sympathy. Once again, these characteristics were evident in both the interviews and the observations.

In summary, there appears to be an almost ideal match between the respondent's managerial role and his dominant subjective characteristics. The indications suggest that the respondent has followed his general dispositions through out his life to develop his expertise in outdoor pursuits, and subsequently to develop his occupational interests, which mesh so well with his overall interest in the outdoors and people. The respondent appears not to allow his managerial role to conflict with his subjective characteristics. His partner can successfully carry out any task that falls outside his domain of expertise. Therefore, in this case, the respondent's subjective characteristics, which are shaped by his cognitive style and his personality and account for his general disposition, appear to be completely responsible for his particular expertise, and the way in which he has shaped his managerial role.

Case 2.

In this case the managerial position takes responsibility for the provision of education for hospitalised children. Children of all ages, preschool onwards are provided for. The requirements are obviously somewhat different from those of a normal school situation. The teachers have to accomplish their teaching in an environment that is far from ideal, due to the condition of the children, the constant presence of medical staff, and frequent unscheduled interruptions to their teaching programs.

The manager is responsible for the staff, and for the overall administration of the school and its teaching programs. Her prior experience and training have made her into a person who appears to be well suited to this position, and this comes across clearly in both the interviews and the observations. She appears to be a committed, perhaps driven person who has in her mind where she wants to be and how she is going to get there. She is highly valued by her staff and colleagues, and well respected as a teacher and administrator. It is clear from discussions with the respondent, and from the comments of her associates that she lives for the job.

As a manager, the respondent appears to make considered analytical decisions largely based on her expertise, although she is seen to consult with others particularly when her decisions impact on others. Her inclination to consider and weigh information before acting is clearly identified in both the interviews and the observations.

The Cognitive Style Analysis (CSA) indicates that this person is accomplished at analysing situations and at gaining a clear picture of the important issues, and the best way to deal with them. It also indicates that she will, due to ability to see a range of options, spend some time weighing the pros and cons before making a decision. Representations of these indications are very conspicuous in the interview and observation data.

The respondent's MBTI response, ISTJ, is highly representative of the person that was identified through interview and observation. The MBTI states that this type of person will be particularly dependable due to her combination of preferences. It indicates that she will base her decision processes on a deep, solid accumulation of stored impressions, which will give her strong, perhaps unshakeable, ideas. Additionally the MBTI indicates that the respondent's judgement can be expected to accept responsibilities after a characteristic reflection on the information. There is also a strong indication that the respondent will have tact, sympathy, and genuine concern when dealing with people. The indications are that this type of person will be attracted to an occupation where systematic attention to detail is combined with care for people, as in the health professions. Overall, in this instance the MBTI provides a description of the respondent's type that is well supported by data from interviews and observation.

The respondent's managerial role appears to fit well with the subjective characteristics that have been identified through interview and observation, and with the psychological evaluations. It is apparent that her general disposition, as determined by her personality and her cognitive style, fits well with her expertise, and that it determines her actions in her managerial role.

Case 3.

In this case the respondent's managerial role is that of Regional Manager for a scientific research institute. The Regional Manager controls an establishment that employs approximately 120 staff, most of whom are research scientists or technicians. The position is responsible for the overall management of the institute's research output, research funding, and the institute's financial management.

The respondent was, until moving into management, an expert research scientist with no management training. As Regional Manager he has attended several appropriate management courses as part of his personal development as a manager. The respondent no longer carries out research, but his expertise is valued in his managerial role, which frequently requires his involvement in the research of other scientists in an advisory capacity. Additionally, his expertise in scientific research enables him to have a good working knowledge of the business of the institute that he is required to manage.

The managerial role is clearly a challenge to the respondent, and this appears to be the justification for him being in the role. He indicates that, in his view, his natural disposition is not ideal for this managerial role. As the Regional Manager, he is aware that the organisation for which he is responsible relies on the application of people's knowledge to problems. This, in his view, requires a consultative, democratic approach to management, which he openly admits is not his natural inclination. However, comments from work associates indicate that the respondent does achieve the desired democratic behaviour when working with people.

It is apparent from interviews and observations that the respondent applies his expert analytical skills to evaluate the requirements of his managerial role. When he has decided, based on his analysis of the situation, what his actions should be to best meet his role requirements, he then follows what he perceives to be the appropriate behaviour to achieve his goal. Therefore, it seems that the respondent is able to overcome his natural inclinations and adapt to his role requirements to suit the occasion.

The respondent's Cognitive Style Response (CSA) indicates that he should be able to analyse situations to gain a clear perspective of the important issues, and that he is likely to make considered decisions. It also indicates that he will recognise a range of options and will want to weigh the pros and cons, which may sometimes make him hesitant in his decision-making. This CSA evaluation aligns well with the respondent's apparent natural disposition, but does not account for his readiness to move away from his natural inclinations in situations where he perceives that to be a desirable action.

The MBTI evaluation also appears to be representative of the respondent's natural disposition. It indicates that this type of person will use his thinking to analyse the world, and prefer to handle ideas and facts rather than situations and people. However, there are two indications provided by the MBTI evaluation that may help to explain the respondent's actions in psychological terms. First the MBTI indicates that when this type of person has to deal with details of daily living he will become intuitive in his approach to situations. This seems to explain the respondent's reliance on his expert analytical skills to resolve situations. The respondent's analytical skills are likely to be typical of those associated with expertise, that is they become automated to the extent of appearing to be intuitive (Ericsson, 1997; Hammond, *et al.*, 1987; Lipshitz, 1993; Simon, 1987). Second the MBTI indicates that this type of person may be quite adaptable up to a point where one of his ruling principles is violated, and then he will stop adapting.

Overall it seems that the respondent perceives that his managerial role demands certain subjective characteristics that are not his natural disposition, and as a

consequence makes a strong effort to adapt his abilities to suit. The respondent's expertise is such that he can call on his analytical skills to evaluate the requirements of the position. However, his analytical skills also appear to create awareness in the respondent that his natural way of acting is inappropriate. This in turn seems to activate a less dominant natural disposition to adapt to situations that do not conflict too strongly with the respondent's general disposition. In the interviews and observations the respondent has indicated that he attempts to monitor his actions to ensure that they are, in his view, appropriate for his managerial role. He also stated that he has a continual struggle to contain what he perceives to be his inappropriate, but naturally autocratic nature.

To summarise, in this case the respondent's desire to satisfy the requirements of his managerial role have caused him to somewhat modify his subjective characteristics. The respondent's analytical skills, which are automatic to the extent of appearing intuitive, allow the respondent to apply aspects of his expertise to resolve the role requirements. He then attempts, apparently successfully, to adapt to the role requirements, as he perceives them.

Case 4.

The managerial role in this case is that of Regional Accountant for a scientific research institute. The Regional Accountant manages the accountancy functions of the organisation, and provides financial information to the Regional Manager. In addition the Regional Accountant controls the institute site security, site repairs and maintenance, and site safety.

The respondent, in this case, is a chartered accountant and has been the Regional Accountant for two years. In her managerial role there are additional functions that her previous accountancy experience did not include. The respondent's main role is heavily dependent on her expertise in accounting, but as a manager she has a greater interaction with people than previously. She has her own staff to manage, and in addition she has to relate to people, many in non-accounting positions, that are outside of her control.

The interviews and observations indicate that the respondent is well able to handle her new tasks. The respondent is seen by her work associates to be very analytical and inclined to weigh information at length before making a decision. However, the respondent has found that in her managerial role, there are occasions where she must make decisions that do not permit the analytical deliberation to which she is naturally inclined. Nonetheless, when the respondent faces situations that involve the consideration of people, she is seen to be particularly capable. One work associate stated that the respondent's "*personality overwhelms the stereo type of an accountant ...she is a people person and understands people so it is surprising that she chose to become an accountant.*"

The Repertory Grid evaluation provided some good support for the interview and observation data. In particular it clearly identified the respondent's separation of her decision-making processes, and her distinct interest in issues involving people. The respondent's Repertory Grid response shows an obvious separation of decision-making elements related to the main features of her expertise, from the other elements; 'knowledge', 'experience', correlate at 95%, and 'financial', correlates with the other two at 90%. The Repertory Grid response may also explain the apparent lack of correspondence between the interview and observation data, and MBTI that is discussed in the next paragraph. It is well known that the outcome from the MBTI is susceptible to the disposition of the respondent at the time when they complete the MBTI form. Perhaps this rather complex individual was more in 'people' mode than 'accountant' mode when she completed the form. The Rep Grid requires an interaction between the interviewer and the respondent, which may keep the respondent focused. In the Rep Grid evaluation the respondent's interest in decision-making situations that are centred on people is identified, once again as a separate group. The group, 'involves people', considered, and 'intuitive' is highly correlated at 95%, but only correlates with the elements related to her expertise at 75%.

The respondent's highly analytical approach spoiled an attempt to obtain an evaluation of her cognitive style through an application of the Cognitive Style Analysis (CSA). She was unable to select answers to many of the CSA problems because, in her view, the range of answers from which she had to choose did not

provide an answer which was sufficiently correct. Therefore the CSA evaluation, which does not align with the perspective obtained through the interviews and observations, is probably not a good representation of the respondent. However the CSA evaluation may not be inaccurate, the MBTI evaluation, ENTP, also identifies a type of person who is different from the one presented in the interviews and observations. The only indication, from the MBTI, that appears to correspond with the other data is one which suggests that the respondent will tend to be more enthusiastic, more concerned with people, and skilful in handling them. The MBTI's indication that this type of person is much drawn to counselling appears to be the most accurate of all.

Overall, in this case, the use of psychological evaluations as a form of triangulation has not provided the anticipated support. However, the interviews and observations, and the Repertory Grid analysis have provided an interesting insight to a person who is apparently well suited to her managerial role, and who uses her behavioural dispositions to the roles advantage.

Cross case analysis.

In each case the respondent has demonstrated that his/her subjective characteristics determine how he/she pursues the achievement of his/her managerial role. Nevertheless, in each case the subjective characteristics have lead the respondents to follow different routes to satisfy his/her managerial role.

In the first case, perhaps because the respondent created the managerial role that he occupies, the match between his subjective characteristics and his managerial role appears to be almost ideal. The respondent clearly follows his natural disposition and is able to apply his expertise unhindered, and therefore meets the role requirements with characteristic ease. Consequently, the managerial role occupied by the respondent is not seen to influence his dominant subjective characteristics.

The second case is similar to the first case. Although the respondent did not create the managerial role that she occupies, the role is well suited to her subjective

characteristics. As a result, the respondent is able to follow her natural disposition, and apply her expertise as best she can. Therefore it can be seen that the respondent's natural disposition has enabled her to meet the requirements of the position without having to modify her natural subjective characteristics.

The third case is different from the first two cases. In this case the respondent is largely working outside his domain of expertise, however he can be seen to apply one dominant characteristic of both his expertise, and his natural disposition, to overcome his lack of expertise in the managerial role. Experts in general are seen to possess excellent analytical skills (Ericsson, 1997; Hammond, *et al.*, 1987; Lipshitz, 1993; Shanteau, 1987; Simon, 1987), and this respondent is no exception. However, as the Cognitive Style Analysis and the MBTI indicate, this respondent appears to have a higher than usual reliance on his analytical ability to interact with the world. It is not therefore surprising that the respondent appears to rely heavily on his analytical ability to determine how he should proceed in his managerial role.

Once the respondent has determined what is an appropriate response he is in a position to respond according to his natural independent, autocratic disposition, if that is what his analysis of the situation suggests. However, his analysis of the situation may indicate to him that a more considered, consultative, and democratic approach is required. If this is the conclusion reached by the respondent, then he is inclined to suppress his dominant disposition and adapt his actions to what he perceives to be a more appropriate response. This adaptive capacity is a somewhat limited and conscious ability which may not work in situations of strong conflict between the respondent's dominant natural disposition and this less dominant adaptive capacity.

However, in the managerial role that the respondent occupies his expertise as a research scientist provides very valuable background knowledge which, combined with his analytical ability, appears to make him well suited to the position. A general disposition towards people, as was demonstrated in the first and second case would probably be desirable in this managerial role, and the respondent

recognises this, but as the MBTI indicates people of that disposition are not generally drawn to scientific research.

The fourth case is a difficult one to assess. It is unlike the first and second cases in that the role and the respondent are not immediately seen as compatible. The respondent clearly has expertise as an accountant, and this is the main function of her managerial role. However, there are indications that her natural disposition is to work with people, which is similar to the first and second respondents. This is an apparent reversal of the third case. In this case the respondent seems to have the people skills that do not come naturally in the third case, but not the total disposition towards her occupational expertise that is so evident in the other cases.

There is, however, one behavioural characteristic that is evident in the interviews and observations that may explain the respondent's interest in accounting. As the case report shows, the respondent continually examined the meaning of questions that were presented to her, apparently wanting to be sure that she understood the question so that an appropriate response could be given. This was particularly evident when she was presented with the Cognitive Style Analysis, where she had great difficulty accepting the answers provided.

With the CSA, the respondent was, in many instances unable to select, what was to her, an appropriate response from the range of answers provided; consequently her response to the CSA is questionable. The respondent's desire to be sure of a questions meaning, and determination to select the most appropriate answer may also explain why the MBTI evaluation is not as clearly representative of the respondent as the applications of the MBTI have been in the other cases. The MBTI is known to be vulnerable to people who report 'particular selves' such as 'work self' or 'ideal self' when selecting answers, or who have difficulty understanding the questions and in selecting acceptable responses (Myers and McCaulley, 1986).

Nonetheless, this respondent is, according to her work associates, well suited to the managerial role. As mentioned above, neither of the psychological evaluations aligned well with the data provided by interview and observation. This leads to a

conclusion that in this instance the responses to the psychological evaluations were flawed. However, the MBTI did indicate that the respondent is likely to be keenly interested in resolving problems, and to have a dominant interest in people that associates with that desire to solve problems. Therefore, there may be some validity in the MBTI response. In conclusion, it appears that the respondent's managerial role does fit with her subjective characteristics, and that her expertise in accounting while aligned with her natural subjective characteristics does not require the application of all her personal dispositions.

In summary, the respondents' managerial roles are seen to be consistent with their subjective characteristics. In the first and second cases the respondent's natural dispositions appear to give them complete command of their roles. In the third case, although the respondent's natural disposition does not provide the same command of his managerial role that is evident in cases one and two, he has the ability to adapt. In this instance the respondent's subjective characteristics enable him to shape his managerial decision-making processes, as he perceives the need. In the fourth case the respondent's subjective characteristics seem to allow her complete command of her managerial role, although her managerial decision-making processes require her to modify her natural inclination to deliberate at length before making a decision. Additionally her managerial role is apparently allowing this respondent to apply some of her subjective characteristics that have not been called upon in her role as an expert.

8.9 Chapter summary

In this chapter I set out to address my overarching research question, - What shapes the managerial decision-making processes of an expert? - by seeking answers to five subordinate research questions. I examined each of the cases, presented as case reports in Chapter 7, in turn to seek answers to the research questions. After each case was been considered, I conducted a cross case analysis in an attempt to identify any patterns or explanations that may be present.

The overall impression gained from the four case studies is that the respondents are representative of experts as defined in the literature (see Chapter 2). They are confident about their ability and rely heavily on their knowledge and experience to process decisions. Their decision-making is considered and usually analytical. In three cases their decision-making processes are also very quick, perhaps giving the impression of being intuitive. This actually reinforces the idea that through extended practice and experience combined with acquired knowledge experts internalise an analytical ability that they can then use automatically. It may be considered as trained intuition (Ericsson, 1997; Hammond *et al.*, 1987; Lipshitz, 1993; Simon, 1987). In the fourth case the respondent, possibly due to the discipline in which she is an expert, is more deliberating than the other respondents. However, in her managerial role she has recognised a need to make quicker decisions, perhaps with less than optimal information. Consequently her decision-making processes are becoming more aligned with the other respondents.

The cross case analyses of the case reports have identified several interesting findings, which may prove to be important.

- First, overall there is a indication that experts' decision-making processes are shaped by their dominant subjective characteristics. Each respondent appears to have become an expert in a domain towards which he/she demonstrates a natural disposition. Having become experts, they have then apparently by choice moved into managerial positions, which they have pursued vigorously in a manner suited to their subjective characteristics. In each case the expert appears to consistently approach decision-making situations from his/her personal disposition rather than from a specific position that can be clearly associated with his/her domain expertise, or influence from their managerial role. This appears to suggest that experts' subjective characteristics determine how they process decisions to reach, what is to them a desirable and appropriate conclusion. Therefore, there appears to be support for the proposition put forward by Einhorn (1974) and Shanteau (1987), that experts subjective characteristics will determine how they process decisions.

- Second, there is a clear indication that the respondents may choose to deal with decisions that directly involve people differently from other decisions. More consideration is given to consequences that may arise from the decision process; more consultation takes place, and process often becomes more important than an optimal outcome.
- Third, there is an indication that some experts may not recognise the value of their own expertise when working outside their domain of expertise. Although, when working outside their domain of expertise, the expert appears to use features of their expertise, such as highly developed analytical skills, there appears to be an inclination to be dismissive of its value in the new situation.
- Fourth, there are indications that the managerial roles occupied by the respondents are shaped by the experts' decision-making processes. However, there are also indications that experts' decision-making processes are in turn shaped by their dominant subjective characteristics. Therefore, it may be concluded that managerial role performance is determined by the incumbents' subjective characteristics.
- Fifth, managerial role appears to have little affect on the experts' decision-making processes, other than to provide an arena in which they can display their skills. This is perhaps to be expected in view of the experts' dominance of the managerial role.

In the Chapter that follows, I present a summary of the study that is the justification for this thesis, a discussion of the theoretical significance of the research, and consideration of the wider theoretical implications. There is also discussion of the limitations of my study, and suggestions for further research.

CHAPTER 9



Summary and Conclusion.

9.1 Summary of the study

This study set out to explore the idea that an expert's subjective characteristics may determine how that expert will process information for decision-making (Einhorn, 1974; Shanteau, 1987). It is accepted that a small study of this nature cannot expect to generalise to the population of experts, the findings relate only to the respondents in this studied. However, the consistency of the findings across the four cases suggests that consideration of the influence of subjective characteristics may be warranted in future studies of experts. The data obtained in the case studies indicates that, for the experts studied, subjective characteristics do determine how decisions are processed, and that there may be, as Einhorn suggested, many paths to a solution and apparently numerous ways to perform the cognitive tasks involved.

This exploration was guided by a specific desire to answer my overarching research question – What shapes the managerial decision-making processes of an expert? The analysis of a variety of data, collected through interviews, direct observations, and psychological evaluations in four separate case studies,

indicates that the experts' decision-making processes were shaped by their subjective characteristics. The influence of subjective characteristics in determining decision-making processes was evident in both domain of expertise and managerial role.

9.2 Summary of research design

The study takes an interpretivist, qualitative approach to the research question, largely based on Naturalistic Inquiry procedures (Lincoln and Guba, 1985; Denzin and Lincoln, 1998). Four experts, who occupy managerial roles, are the focus of individual case studies. Data is obtained through interviews, direct observations, and psychological evaluations as a triangulation procedure to provide credibility to the findings. The research database in the form of a 'thick description' derived from the four case studies is analysed in detail to answer the following five questions.

Question 1. How does an expert make decisions in a managerial role?

Question 2. How do an expert's decision-making processes influence his/her managerial role?

Question 3. How does the managerial role influence the expert's decision-making processes?

Question 4. How does the expert's preferred decision-making style fit with his/her behavioural characteristics?

Question 5. How does the expert's management role fit with his/her behavioural characteristics?

Answers to these questions provide interesting and important information, which collectively answer my overarching research question.

9.3 Summary of findings

As mentioned in the research design summary above, five questions were applied to the data contained in the 'thick descriptions' in an attempt to answer the main research question – What shapes the managerial decision-making processes of an expert? In this section I present a brief statement explaining what each question considered and what was found, and finally relate these findings to my overarching research question.

Question 1 – How does an expert make decisions in a managerial role? This question was intended to identify any examples of pattern formation associated with decision-making processes, which are displayed by the respondents in the four case studies. Pattern formation can be thought of as the shape, or form that the respondent's decision-making processes take.

Overall, there appears to be one main shaping factor that defines the respondents' approach to decision-making. This shaping factor appears to take the form of a hierarchy. The hierarchy is dominated by the respondents subjective characteristics which seem to have determined the respondents' career path, and therefore the experience/knowledge that they have gained, which in turn has lead them to particular managerial goals and responsibilities.

Within the overall shaping factor six distinct patterns were identified as representative of the four experts' decision-making processes within their managerial roles.

1. The experts continued to rely on their expertise when they moved into a managerial role.
2. The experts were aware of the domain boundaries of their expertise, and sought assistance from what they considered to be better qualified people.
3. The experts, in some instances adapted their decision-making processes to accommodate managerial requirements outside of their domain of expertise.
4. The experts appeared to be unaware that their expertise could be valuable outside of their domain of expertise.

5. The experts' analytical skills were not domain specific.
6. The experts distinguished between appropriate decision-making processes for decisions that directly involve people, and decisions that do not.

Question 2– How do an expert's decision-making processes influence his/her managerial role? – This question was intended to identify how the shape of his/her decision-making processes, as identified in question one, influenced the respondent's managerial role. The term managerial role here means the functions carried out by the respondents in their job as a manager.

The managerial roles undertaken by the respondents appears to be shaped by their decision-making processes, which in turn seem to be determined by their subjective characteristics. Apparently these experts approach their decision-making from a perspective determined by their subjective characteristics rather than from a perspective that can be clearly associated with their expertise. The experts' subjective characteristics apparently determined how they would proceed in any given situation. Therefore, how the experts perceived the goals of their managerial role and the path that they would follow to accomplish those goals was determined by their subjective characteristics.

Question 3 – How does the managerial role influence the expert's decision-making processes? – This question takes an alternative perspective from the previous question; to consider the possibility that strong influences associated with managerial responsibility could alter the shape of an expert's decision-making processes. Managerial role is defined above.

The four experts dominate and determine their managerial roles to such an extent that no influence from the role is evident. This resistance to influence from the managerial role may be explained by the experts' subjective characteristics. The experts have in each case become expert in a domain towards which is he/she has a strong natural disposition. Furthermore, in becoming an expert they have assimilated extensive knowledge and experience, which forms the basis of their judgement, and is unlikely to be modified easily.

Question 4 – How do the expert's dominant decision-making processes, in the managerial role, fit with his/her subjective characteristics? – This question was intended to identify any association between the observed behaviour and measured behaviour. To meet this goal the shape of the respondents decision-making processes, as determined through interviews and observation, were compared with the psychological evaluations.

Three of the four cases demonstrated that the respondent's overt behaviour was well aligned with what the psychological evaluations predicted would take place. The respondents were observed to be well suited to the demands of their managerial roles. In the first two cases the respondents' expertise totally satisfied the requirements of their managerial roles, and their overt behaviour was seen to be well suited to their role. In both instances the respondents' psychological evaluations agreed with the observed behaviour.

The third respondent's overt behaviour was seen to have two distinctly different forms. He defined them as autocratic and democratic. Within his domain of expertise he tends to be autocratic, and this is his preferred disposition, but as a manager he often chooses to be democratic because he considers that this is a better means to achieve his managerial goals. The psychological evaluation of this respondent strongly indicates his preferred disposition, but also indicates that he has a limited ability to adapt when he chooses to do so.

The fourth case was not so clear. The respondent's overt behaviour within the context of her expertise aligns well with her strong preference for analytical, considered processing, but her overall psychological evaluation does not fit well with her expertise. However, her managerial role is a better fit.

Overall the respondents' overt subjective characteristics do align closely with the predictions obtained through psychological evaluation. It can be argued that this is to be expected, because this is what the psychological evaluations were designed for. However, the alignment is often not as conclusive as it is in these cases, and non-experts may possibly have a much greater deviation (Bathurst, 1996).

Question 5 – How does the expert's management role fit with his/her subjective characteristics? – This question examines the appropriateness of the expert's general disposition for the particular managerial role that he/she occupies.

The managerial roles into which the experts have moved are in each case what the expert has chosen as a career path. This seems to indicate that, to the experts the managerial role is seen to be compatible with their general predisposition, as determined by their idiosyncratic subjective characteristics. If it were not then presumably they would have selected some other career option. The information about the respondent obtained through the interviews and observations indicates that in all four cases the experts are behaviourally suited to their managerial roles.

The psychological evaluations indicated that the respondents in cases one and two are well suited to their managerial roles. In case three, the psychological evaluation aligns well with the respondents expertise as a research scientist, but not so well with some of the managerial role requirements, although there is an indication that the respondent can adapt to some extent when he chooses to do so. The fourth respondent's psychological evaluation indicate subjective characteristics which should facilitate a successful interaction with people, which is now an important part of her managerial role but was not an important aspect of her expertise as an accountant.

The research question – What shapes the managerial decision-making processes of an expert? – The research question was formulated as an umbrella under which experts could be studied from a behavioural perspective. The five questions discussed above have provided some new and interesting information to answer my research question, although it is clearly specific to the four cases studied and no generality is assumed. In particular:

- The experts' subjective characteristics appear to determine the domain in which they have become expert, and consequently the managerial role that they have sought, and also the managerial decision-making processes that they follow.

- The experts' managerial decision-making processes were first shaped by their subjective characteristics, second by their expertise, and last by their managerial role.
- The experts openly dichotomised their managerial decision-making processes to distinguish between those decisions that directly involve people and other decisions.
- Their managerial role apparently caused the four experts to call on aspects of their subjective characteristics, which their expertise does not exercise.

Overall, there is a noticeable application of subjective characteristics shaping the managerial decision-making processes of the experts in this study.

9.4 Theoretical significance

The findings of this study are theoretically significant in that they provide new knowledge about experts and decision-making. However, the findings relate to four specific cases, and transferability is neither demonstrated nor implied. A 'thick description' of the case studies is provided in the Chapter 7 to enable further enquiry to be made about possible transferability.

There is an apparent dichotomy in decision-making.

This research identifies a clear separation in decision-making processing that takes place between decisions that directly involve people and other kinds of decision. Although existing decision theory explains many different aspects of decision-making, it does not address this issue. In all four case studies it is clear that the respondents believe that decisions that directly involve or affect people require greater consideration. This may be because the respondent is a 'people person' who tries to ensure that the people for whom he/she is responsible are treated appropriately, or it may be because the respondent recognises that his/her goals are best achieved through the co-operation of others. Whatever the reason

the distinction was obvious to the observer, and acknowledged by the respondents.

The identification of this dichotomous outcome has taken on greater importance since the review of this thesis because it is now known that Shanteau has conducted research in this area with a similar identification of the dichotomy but with opposing emphasis. Shanteau's studies show a greater care with decisions that do not include people (personal communication, 2000).

Experts' subjective characteristics appear to dominate.

This research found that, in the four cases studied, each expert's subjective characteristics apparently determined and defined his/her actions. Although Einhorn (1974) and Shanteau (1987) indicated that an expert's subjective characteristics probably influence their decision processes, there is no indication in the literature that an expert's subjective characteristics actually determine how that expert processes decisions. In this research there are clear examples that the experts process information in a decision-making situation according to their personal disposition towards the situation faced. The training and experience that created their expertise are apparently only the tools used by experts to achieve their personal objectives. The objectives are first determined by their idiosyncratic subjective characteristics, and then satisfied by the selective application of knowledge and experience, which was predetermined by their subjective characteristics.

Expertise aligns with subjective characteristics.

Each respondent has become an expert in a domain towards which he/she demonstrates a strong natural disposition. The data suggests that the respondents have become experts in domains which suite their subjective characteristics, and in particular their specific approach to decision making. This finding may add weight to the argument that the attainment of particular expertise is associated with subjective characteristics, although once again no generality is assumed from these case studies. However, Ericsson and Charness (1994) suggested that if this

link exists, it could counter their argument that expertise could be acquired by anyone who practices sufficiently hard and long.

It has been stated that expertise is acquired through extensive, specific, and deliberate practice, and that there is no requirement for innate abilities or capacities (Ericsson and Charness, 1994). The first part of this statement seems to be well supported by this research, but the second part is brought into question. This research indicates that there are particular subjective characteristics, which can be called innate abilities, and/or capacities, that determine in a very dominant fashion the actions of the four experts studied. Whilst this data can not challenge the work of Ericsson and Charness, it does according to Denzin and Lincoln (1998) call into question the generality of their statement.

Although, Ericsson and Charness strongly support the proposition that expertise is a completely learnt attribute, they do acknowledge “*one critical flaw*” in the evidence on expert performance. The people who achieve expert status “*are not randomly assigned to their training conditions. Hence one cannot rule out the possibility that there is something different about those individuals who ultimately reach expert-level performance.*” Nonetheless, they consider a requirement for innate ability and capacity to be inconsistent “*with the reviewed evidence*”. They go on to state “*More plausible loci of individual differences are factors that predispose individuals toward engaging in deliberate practice and enable them to sustain high levels of practice for many years*”. Ericsson and Charness suggest that this predisposition may be due to environmental factors, or that “*preferred activity level and temperament may have a large genetic component. Furthermore, there may need to be a good fit between such predisposing factors and the task environment for expert level performance to develop.*” There are two important issues here. First, if there is any possibility that there is something different about people who become experts, and if those individual differences predispose those people towards the achievement of expertise, then how has the possibility of innate ability been eliminated? Second, if goodness of fit between the predisposing factors and the task environment are at all critical, then extensive, specific, and deliberate practice alone seems unlikely to result in the acquisition of expertise.

In addressing the first issue it is interesting that Ericsson and Charness suggest that a genetic component may account for a person's disposition, while at the same time discounting the possibility of innate ability. Both are by definition present at birth, and it is difficult to distinguish between the two. Nonetheless, whether they are genetic or innate appears to be less important than the acceptance that subjective characteristics are fundamental determinants of how expertise is acquired. There is evidence that a hereditary, or genetic component does account for subjective characteristics derived through the configural model of genetic inheritance (Eysenck, 1995; Lykken *et al.*, 1992). Therefore, the idea that genetic inheritance can account for at least some aspects of expertise appears to be valid.

The second issue, arising from Ericsson and Charness statements, builds on the first. If the acquisition of expertise is dependent upon the existence of some predisposing characteristics then either of two possible situations may exist. First, if experts are in some way collectively different from other people in respect to the acquisition of expertise, but otherwise the same as one another then it may be expected that extensive, specific, and deliberate practice could be the only requirement for the acquisition of expertise. However, this would suggest that all experts have the same predisposition, and this is simply not acceptable. A second, more plausible explanation would accept that the similarity between experts could be defined by their collective difference from non-experts, while also accepting that experts are different from one another. Different in that they possess an idiosyncratic predisposition, which will determine their goals and the distinct paths they will follow to achieve those goals (Eysenck, 1995). Environmental factors such as socio-cultural influences, location, and opportunity will undoubtedly influence the possibility of an individual becoming an expert, as will the effort that is applied to its achievement, but without the predisposition, be it genetic or innate, the development of expertise appears to be less likely to occur. The research findings presented in this thesis indicate that subjective characteristics of the respondents do determine both their predisposition towards activity level and task environment, and additionally determine how they will carry out associated functions.

Expertise may be transferable.

This research indicates that the experts studied can, outside of their domain of expertise appropriately use facets of expertise, such as analytical decision-making skills. This is contrary to some evidence, which suggests that, outside of their domain of expertise experts are no better than novices (Camerer and Johnson, 1991; Carroll and Johnson, 1990). This ability is particularly evident in cases three and four of this research. In both cases the experts’ managerial roles require them to make some decisions that are largely outside their domains of expertise. The respondents satisfy this requirement successfully by using their highly developed analytical skills to evaluate the role requirements, and also discover the appropriate paths to accomplish those requirements.

The respondent in Case Three has an ability to analyse situations in detail, he also has an ability to be adaptable in situations that do not fit comfortably with his preferred decision-making processes. The respondent in Case Four is also highly analytical in her decision-making, and has available to her a wider range of subjective characteristics than are usually required in her domain of expertise. In situations outside the norm she is able to follow approaches to problem solutions that are different from those she would normally choose. In both cases it is seen that the respondents’ have abilities, determined by their subjective characteristics, which enable them to work successfully outside their domain of expertise. However, experts who have subjective characteristics that do not readily apply outside their domain of expertise may not be able to transfer their skills in a similar way; they may not be able to adapt.

9.5 Wider theoretical implications

Decision theory. The apparent dichotomy in decision-making processing that is mentioned above adds weight to the argument for a more behavioural approach to decision-making research (Klein *et al.*, 1993). If as this research suggests experts

decision-making processes are determined by their subjective characteristics, it seems reasonable to expect that the decision-making processes of non-experts will to an extent also be determined by their subjective characteristics. Non-experts may not be as strongly constrained by their subjective characteristics, due to an absence of an extended development period in a domain, which closely satisfies their personal disposition, and thereby reinforces a dependence on judgements based on their personal disposition. Therefore external factors, such as managerial role may exert a greater influence than is seen to be the case with experts.

Strategic management. Recognition of the importance of cognitive style and personality in strategic management is well established (Haley, 1997; Hayes & Allinson, 1994; Schwenk, 1995). However, the approach has been to show what outcomes may be expected from people with particular cognitive styles or personalities. Furthermore, in many instances there is confusion about what is cognitive style and what is personality; often the terms are interchanged. There is however, little consideration of the “*managers cognitive trails*” (Haley, 1997). Haley suggested that managers with different personality types might form different approaches to decisions. In the case studies presented in this thesis it has been clearly demonstrated that subjective characteristics of the respondents do determine how they process decisions. Additionally, it was seen that although managerial role provided a focus for those subjective characteristics, it did not appear to cause the respondents to deviate from their general disposition. This adds support to Haley’s concern that subjective characteristics of decision makers responsible for strategic management decisions deserves closer scrutiny.

For many years vocational guidance counsellors have advocated that people with particular subjective characteristics should be appointed to appropriate vocations. Both the Cognitive Style Analysis (CSA) and the Myers-Briggs Type Indicator (MBTI) are used by counsellors for this kind of selection process (Riding, 1991). There is also evidence that human resource management uses both of these psychological evaluation tools for recruitment and personal development (Coscarelli *et al.*, 1995). However, there is little or no evidence that Strategic Management is following Haley’s call to develop a better understanding of the managers’ decision processes. Therefore, my research appears to be the first to

provide some indication that, as Haley suggested, a manager's strategic decision-making is largely determined by his/her subjective characteristics.

There are often many paths to reach strategic goals but, when a path is chosen, achieving those strategic goals is usually the main focus. However, by selecting a path, which will achieve strategic goals, and also optimise implementation process through particular attention to the subjective characteristics of the strategic decision maker, there may be many additional benefits to be gained. This issue is particularly important when it is recognised that only 17% of US managers see things in personal/interpersonal dimensions, the remainder only recognising the technical and structural dimensions (Haley, 1997).

9.6 Limitations of the study

Several limitations (repeated below) were identified in Chapter 6, section 6.4.4 Limitations. This section identifies and considers additional limitations.

- This is an exploratory study, which examines some potentially interesting behavioural aspects of four distinctly different domain experts. A study of this nature does not permit any firm conclusions to be made about the actions of other experts. At best some aspects of this study may justify further research. Therefore, the study does not claim any general application across areas of expertise, management, or decision-making.
- Given the nature and assumptions of qualitative research the findings of my research could be subjected to other interpretations.
- The psychometric tests used in this research are not intended to be comprehensive; they are used as additional data to aide in assessing the

validity of data gained through other sources, i.e. as a triangulation aide. Consequently no detailed psychological reports are presented.

Respondents. It must be recognised that domain experts in any field are busy people with great demands placed on their time. Therefore I was fortunate to gain the co-operation of four experts. However, questions can rightly be asked about the selection process. I knew three of the respondents before my research began, which almost certainly influenced their decision to participate in my research. The fourth respondent, the accountant, was introduced by one of the other respondents.

Perhaps because I had an established relationship with three of the respondents they were more sympathetic towards my research requirements than other people may have been. This may explain why the accountant was less open in her comments than the other respondents. However, I think that the respondents are very credible examples of experts working in managerial roles. Additionally, I am sure that the respondents are very professional people who have been totally honest in their responses to my enquiries, and that there should be no suggestion of bias.

Another area of concern is that the amount of data presented may be considered insufficient. Much of the data obtained was repetitive, and repetition may be seen as confirmation of the data's validity but it does not make interesting reading in a thesis. An additional factor that must be considered is, as I have stated above, domain experts are busy people with great demands placed on their time, so although they willingly gave time to my project, much more than I asked for in fact, the information gained is very constrained by their availability.

One further point to consider about the data collection is that the researcher processed much of the data as it was obtained, and it would of course be filtered and thereby reduced. Perhaps this unwittingly provides support for my decision not to use protocol analysis; it is very difficult to think about information being received and at the same time to make detailed records of events as they unfold. However, I did in Chapter 5 declare that my research approach would be that of a constructivist, which by definition determines that a qualitative study of this kind

is constructed from the researchers observations and interpretations, with information that appears to the researcher to be inconsequential omitted.

Repertory Grid. The Repertory Grid Technique was relatively unknown within my school of study, the associate Professor of Marketing being the only person who was aware of it. I had some knowledge of Kelly's work and realised that it would be very useful in my data collection, however there was no recent information available to me through library sources and it was only when I searched the Internet that I started to obtain information about current use. The mathematical requirements of the Repertory Grid Technique proved daunting, but the data collection interviews that form the initial part of the Repertory Grid Technique were seen to be very valuable and were initially the main purpose for using this evaluation process. The interview scripts are recognised to be very informative (Kelly, 1955; 1963), and my early attempts to locate user friendly software to process the data were not successful. There are of course several mathematical packages that a skilled person could use to evaluate the data, but I lacked the skill and did not want to jeopardise the validity of the data, so I sought a simple program that would allow me to input the data and produce incontestable output. The original software that I considered was at NZ\$1500 beyond my student budget. After data collection was complete I was made aware of the facility at Calgary University, particularly the WebGridII web site. There is also an extensive Personal Construct Psychology (PCP) data base that forms the home site for links to several sites around the world, including the University of Wollongong in Australia, butt there is no address in New Zealand. WebGridII is a user friendly, dedicated facility that removes any requirement to use more generic statistical packages such as SPSS or SAS and importantly removes any concern over validity of data analysis that could exist with generic statistical packages.

Mildred Shaw and Brian Gaines, mathematicians and computer software engineers, developed WebGrid II at Calgary University and have worked extensively on Repertory Grid analysis (see Shaw and Gains, 1998). Professor Shaw, now Director of software engineering at the university of Calgary, worked on the development of a computational model of Kelly's 'Geometry of Psychological Space' at London University around the time of Kelly's death and

went on to develop further computational models before moving to Canada. Brian Gaines proved helpful on several occasions when I had difficulties, and had I made contact earlier in my research I believe that I could have made a much better data collection. By collecting the data myself and then feeding it to the computer I missed the opportunity to allow the respondents to interact directly with the WebGrid II program which has the facility to question responses and to suggest alternatives, thereby giving respondents feedback which could improve the quality of the data obtained. I may therefore have obtained more knowledge from the analysis of that data.

Data analysis. A qualitative researcher has to call on all his/her skills to attend to the various situations that arise. This “*Jack [or Jill] of all trades*” is known as a *bricoleur* (Levi-Strauss, 1966). A Qualitative researcher-as-*bricoleur* uses whatever resources are available as the research evolves. The selected research path is largely determined by the context and what the researcher is able to do within that context (Denzin and Lincoln, 1998c). A *bricoleur* recognises that his/her research is a synergistic process that involves all the things that represent him/her as a person. This includes among other things, gender, race, language, social grouping, work history, education and experience. A *bricoleur* also recognises that he/she interacts with, and is influenced by the people and the context that make up the research setting. Consequently, interpretation of the research findings is largely dependent on the researchers idiosyncratic perspective of events and issues. Therefore, no one interpretation can be seen to be the truth.

Finally, given the clear benefits of hindsight, and the knowledge that I now have, I would take a totally different approach to this research. I now recognise that some areas of my research were unnecessary, and others should have received far more attention. I also accept that the study could have been simplified and thereby made easier. Nonetheless, such is life. There are I believe some interesting findings, and as an educational exercise it has been magnificent.

9.7 Areas for possible future research

Contrary to Carroll's (1993) statement that "*the literature of organisations and management is not concerned with the characteristics of managers and their behaviour*" there is ample evidence that researchers in these areas are concerned (see for example Coscarelli *et al.*, 1995; Hayes and Allinson, 1994; Haley, 1997; Shanteau, 1992; Schwenk, 1995). Further research, which considers the subjective characteristics of individual managers and the influence that those subjective characteristics have on managerial roles and organisations, appears to be worthwhile.

There are, as Carroll (1993) states many studies that have used questionnaires and interviews to determine what managers do as a group. These studies present statistical evidence that indicates how managers go about their work (see for example Nutt, 1988). However, statistical evidence is rather limited in its application to real situations. People can be measured by statistics, but people by their nature do not always conform to patterns, and as a consequence there are many behavioural variations that are not properly explained by statistics (Denzin and Lincoln, 1998abc).

Langley *et al.* (1995) point out that the management literature has tended to ignore the individual differences of management decision makers. However, many researchers accept the view that there is potentially great value in developing a better understanding of the subjective characteristics of the individual manager (Haley, 1997). Consequently, there are many opportunities for research in this area.

An additional avenue for further research could pursue the findings in my research that each of the respondents separated decisions that involved people from those that did not. This has not been mentioned in the literature and is surely worth further study. A study could be developed to examine this separation to determine whether it is true for experts with cognitive styles and personality types different from those who featured in this research. This particularly important since I have become aware that Shanteau has conducted some research in this area and has

found evidence which aggress with this separation but finds preference given to non people decisions rather than to people decisions as I found (personal correspondence, 2000).

Also, there must be many people who possess the appropriate subjective characteristics to become an expert who for various reasons have not. A study that identifies these people and explains why they have not become expert could add to the understanding of experts.

In the context of my research, there appears to be potential to develop a new perspective on the decision making process of experts, a perspective which considers in greater detail the cognitive requirements of a task rather than the simply the achievement of a desired outcome. There may be many paths to a solution but perhaps it takes an expert to select the most appropriate for the skills available. Experts may be people who have exceptional cognitive clarity and consequently superior understanding of their environment (their world), due to the appropriate alignment of their personality and cognitive style with their personal interpretation of events.

Appendix

The University of Waikato

Human Research Ethics Committee

Consent Form

Please read carefully

I have read the Information Sheet provided for this study, and the structure and intent of the study has been explained to me. My questions about the study have been answered to my satisfaction, and I understand that any future questions I may ask will be answered as clearly as possible.

I understand that I am free to withdraw from the study at any time, or to decline to answer any questions. I agree to provide information in confidence to the researcher, and no information that I provide will be available to any other person in any form that can be identified with me or my employer.

I agree to participate in this study under the conditions set out above.

Name:_____

Signature:_____

Date:_____

Researcher: Peter Gilmour

Signature:_____

University of Waikato

Information Sheet

Purpose of the study.

The intent of the study is to obtain knowledge that can be used to develop a prescriptive learning programme for people who are training to become managers; to improve their application of knowledge, particularly in decision making situations.

What I am studying.

I am studying people who have developed an expertise in a field other than business management, and who have then become managers. I want to acquire information on how they acquire new knowledge, how they adapt their knowledge from one field to the other, how their personal cognitive style is reflected in their work, particularly in decision making situations.

What I am looking for.

I will be looking for information related to your specific expertise, your managerial functions, your cognitive functions, and the adaptation of your natural or preferred processes in decision making, to your work environment.

What I would like your help with.

My study requires some detailed information about your education, training, and experience, plus some discussion, observation, and a few short tests. The study can be broken up into short periods spaced over several days, and the program can be arranged to fit into any time you can make available to me. I anticipate the total time require to be about three to four hours.

Potential benefit for you.

The tests that you will be asked to complete are, a decision making test, a learning style inventory, a cognitive style analysis, and a personal type indicator. You should find the results interesting as a personal insight, and they may be useful as reference points for your personal development.

University Of Waikato

The following items are intended to elicit a clear verbal picture of you, as a person with specific expertise and managerial responsibility. Please be as free as you can with the information requested, and if you can provide additional information that you consider to be important please do so.

Data synthesised from the information that you provide, will form the foundation for the continuation of this research. Observations and structured questions will be keyed to your responses, so please be as clear, precise, and unambiguous as possible.

1. Biographical details
- | | | |
|-----|-----|---------------|
| F/M | Age | Ethnic origin |
|-----|-----|---------------|
2. A comprehensive list of all your education and training, and all your qualifications (to include all your development in the field of expertise, and any additional training including all management training).
3. A comprehensive list of all your experience in the field of expertise, and in areas that are seen to be associated with that field, including all types of management.
4. Your occupational history (a brief description of the types of occupation and the approximate periods involved).
5. Description of your current occupation (in sufficient depth for a non-specialist to be able to grasp) .
6. Description of your field of expertise and your occupation within that field ie. specific expertise (in sufficient depth for a non-specialist to be able to grasp).
7. Description of your managerial position, responsibilities, staff, and of the interaction, or overlap, between your field of expertise and your managerial responsibility (in sufficient detail for a person out side your organisation to understand).

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